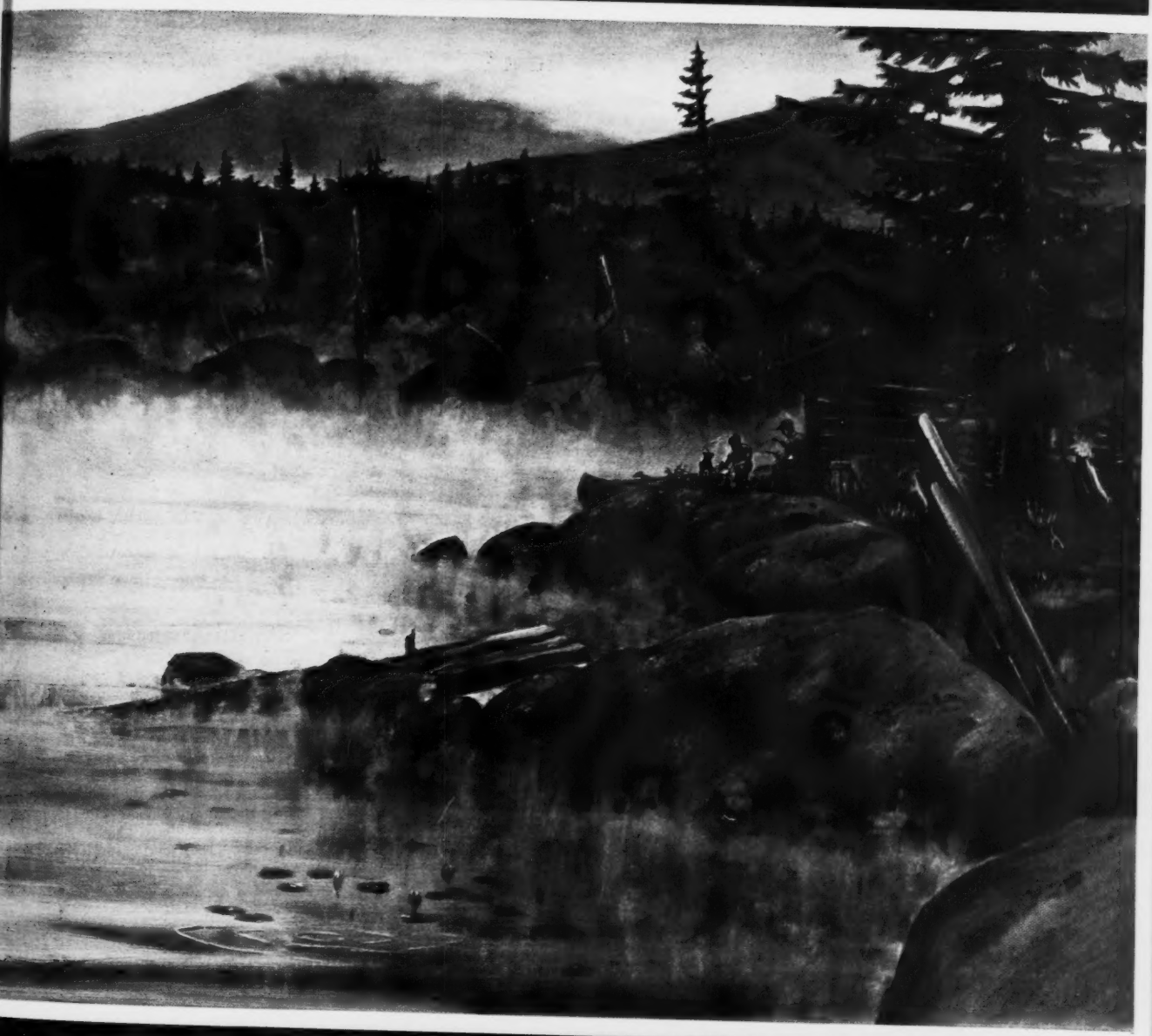
THE CONSERVATIONIST

State of New York Conservation Department August - September 1961



THE CONSERVATIONIST

State of New York Conservation Department

Anatomy of a conservationist

First you take a boy. Let him have a good home. Let him grow up where there are woods and fields, marshes and rivers, streams and ponds and lakes. Let him live by the sea with sand and tides, with storms and the sound of the surf. Let him lift his eyes to the mountains; know the depths of the forest. Let it be any of these, but let there be earth and sky and room to grow.

Let him have eyes to see, ears to hear, fingers to touch. More than anything, let him have curiosity; a need to know. Let him see the rhythmical flashing of fireflies over the meadow—and wonder. Let him watch the changing patterns of northern lights in the autumn sky—and wonder. Let him see glistening spring pools, gathering rills, hurrying streams, the mighty river—and wonder. Let him feel the warm, moist soil; touch the growing leaves with his fingers—and wonder. Let him see, and hear, and touch all of nature around him, and let him want to know.

Now let the boy learn; let him have good schools. Let him have teachers with wisdom and understanding, and most of all with magic keys to unlock the doors of the mind. Let him look to the far horizons of knowledge, and let him be assured that beyond these are new horizons to explore, new challenges.

Open the doors of the mind, provide challenge, provide the tools and the opportunity to work; the opportunity to create, and recognition of accomplishment. This is the anatomy of a scientist. These are the ingredients of a biologist, an astronomer, an oceanographer, a forester, an hydrologist, a geologist, a physicist—of all the scientists who devote their lives to pushing back the frontiers of knowledge; to broadening our horizons of understanding; to making this a better, more productive world in which to live.

These are the backgrounds; these are the motivations; these are the challenges; these are the objectives; these are the accomplishments of the scientists who serve all of us in this broad field of conservation of our natural resources. —Editor

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Mr. Boat Inspector

by Warren W. Stout, Assistant Director, Division of Motor Boats

EVER take a ride on Lake George's famed "Mohican" or "Ticonderoga?" Or the scenic excursion down the Moose River? Have your youngsters drifted in a trapper boat at Freedomland?

Want to be master, pilot or engineer of a commercial vessel on New York waters?

Interested in holding a regatta or marine parade?

Does your town or village want to pass an ordinance regulating pleasure craft?

Thinking about making an extra long addition to your dock off your cottage shore?

If so, chances are that you'll come in contact sooner or later with the work of the Division of Motor Boats' new Marine Services Section and its Chief, William J. Kiely.

For "Bill" Kiely, whose Civil Service title is Senior Marine Services Representative, is "Mr. Boat Inspector," and it's his responsibility to establish or provide adequate safeguards for millions of people who are attracted to or use the State's waterways for pleasure or business.

Last year, for example, more than a million and a half people were passengers on the 185 commercial or "public" vessels that underwent personal inspection by Mr. Kiely and were awarded certificates of compliance with safety regulations. At the same time, the qualifications of 286 crew members (masters, mates and engineers) of these vessels were examined and appropriate licenses issued.

The result? An outstanding safety record, with only one public vessel accident reported.

As indicated, these are but two of the many new Marine Services now assigned to the Conservation Department and the Division of Motor Boats—all as the result of recent action by the Legislature.

Other functions include the issuance of permits for regattas or marine parades; the responsibility of authorizing the placement of privately-maintained navigation aids on State waters; the granting of permits for setting out buoys or other objects; investigating dock and pier construction plans for potential navigation hazards; the development of standard inland navigation aids and markers; establishing priorities for and investigating potential locations for boat-launching sites; developing marine equipment standards and inspecting public vessels for compliance; investigating complaints of non-compliance and the holding of revocation hearings as necessary.

How did the Conservation Department become involved in these activities? How may they affect you as an individual, boat or cottage owner? And who is "Bill" Kiely? Well, let's take a look.

Back before the turn of the century, excursion boats dotted New York State waters and travel by boat was often the surest, fastest and, sometimes, the only method of travel. But such travel was frequently hazardous, for most vessels were steam-powered and boiler explosions all too common.

To protect the public, it became necessary to establish an adequate safety inspection program. On Federal waters, this responsibility was assigned to the Coast Guard. On so-called inland waters such as Lakes George, Placid, Saranac and Chautauqua (those not connected to tidewaters by navigable streams, or canals), the responsibility was that of the State, and laws were passed providing for annual inspection.

For a time, two State inspectors were required to handle the hundreds of commercial craft which plied the inland waters. Then came the automobile, improved aircraft and the development of the mass-produced outboard motor—and the steamboat trade dropped off. By 1920, the marine inspection service was a one-man operation.

But by mid-century, the pendulum had swung back and the former steamboat lines, attracted by the swelling tourist and summer resident populations, converted the boats to diesel and gasoline to handle the new trade. At the same time, hotels and motels and children's and adults' summer camps began providing their guests with small excursion craft service. Water skiing schools sprang up.

Many of these vessels were classified as public under the law, and inspection was required. From 1914 to 1957, these inspections were made by a man whose yearly inspection call was a certain sign of spring or of coming open water for hundreds of inland commercial vessel operators. He was Capt. William Sickles, the first man to carry the official Civil Service title of Boat Inspector. "Cap.," as he was affectionately known to all, helped keep New York State waters safe for commercial travel for 38 years before retiring to pave the way for the appointment of "Bill" Kiely.

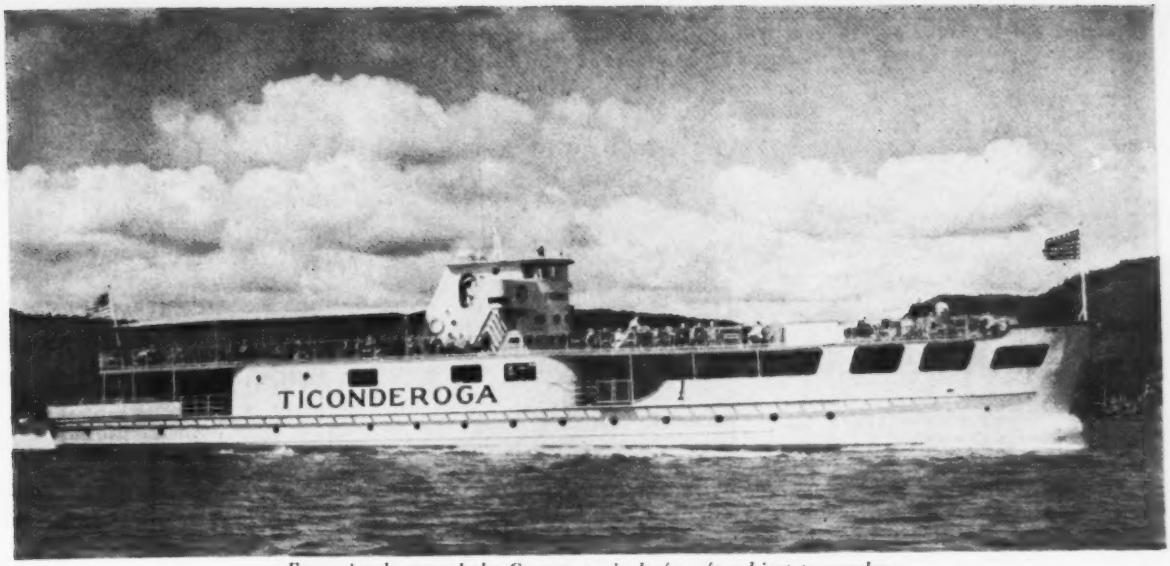
"Bill" came to the State well qualified. Those who have seen his close-cropped reddish hair topped figure ambling down a pier or dock immediately know that here is a man who has spent a good part of his life on water. At closer range, a small blue anchor tattoo on a hand confirms the salty wanderlust that carried him all over the world, serving in every capacity—from able-bodied seaman to master of his own vessel—for more than thirteen years.

Technically, too, Kiely passes muster. He has attended the U. S. Maritime Services Seaman and Officer Training Schools, passed U. S. Coast Guard examinations and was licensed as a Merchant Marine Deck Officer and in the maintenance and operation of gyro, Loran and radar equipment. As a Chief Warrant Officer, in a U. S. Army Marine Transportation Battalion, he was master of seagoing craft engaged in amphibious operation and marine research.

He is an expert on piloting and navigation, ship construction, lifesaving and firefighting equipment and portable marine railway installations. Among his specialties was the supervision of marine work in connection with the construction of De Long type piers and aerial tramways, including the placement of buoys, driving of footings for caissons, inspection of underwater areas by diving, directing towing operations for pontoons and caissons and the construction of breakwaters.

To this impressive background Kiely has added other important qualifications

In 1960, the Legislature and Governor Rockefeller assigned the Conservation Department responsibility for administering the State's Navigation Laws. The new boating laws concerning registration and operation of pleasure vessels are generally well known. Less known are the laws relating to commercial boat operation and the issuing of special permits for regattas, navigation aids and buoys. Here's a brief rundown on these new Conservation Department responsibilities and a profile of the man who is charged with administering them.—Editor



Excursion boat on Lake George, typical of craft subject to regular safety inspection by the Department's Division of Motor Boats

over the years—a sense of humor, the ability to write reports that cut away red tape and get to the heart of the matter and a strong sense of fair play.

The sense of humor has frequently come in handy. It's no laughing matter when "Bill" has to destroy a hundred faulty life preservers valued up to $10 each in order to make certain that they will not jeopardize the lives of passengers carried on a commercial vessel. It's frequently a heavy expense for the commercial operator. "Bill" often manages to ease this kick-in-the-wallet with a few pertinent anecdotes and, somehow, the fiscal burden seems lighter.

His report-writing ability has a sea-lawyer flavor true to the tradition of Charles Dana. There's no doubt about what "Bill" is driving at when you read one of his memos.

"Bill" is also empowered, under the law, to call and hold hearings regarding disputes which may arise following such actions as a revocation of license for due cause. Here, his fair-mindedness is a major asset.

Shortly after "Bill" joined the Department of Public Works, the Joint Legislative Committee on Motor Boats, under the chairmanship of former Assemblyman Charles A. Cusick, began investigating the overall problems connected with the increasing boat population. The result of this committee's studies was the establishment in 1959 of the new Division of Motor Boats within the Conservation Department—in accord with the aims of the Federal Boating Act of 1958. The Department was selected because of its natural association with all forms of water recreation.

During the period of transition, Kiely was a key figure. His technical know-how and ability helped pave the way for the orderly establishment of the new Conservation Department agency.

In 1960, the Legislature, acting further, turned over complete responsibility for the administration and enforcement of the State's navigation laws to the Conservation Department and Kiely was transferred from the Public Works' Bureau of Canals to the Conservation Department, where he was assigned as Chief of the Marine Services Section of the Division of Motor Boats.

Because of increased workloads and the assignment of additional duties, the Marine Services Section was recently reorganized. Kiely now holds the Civil Service title of Senior Marine Services Representative. In this capacity he continues in supervision of the State's laws in regard to the operation of commercial vessels. At the same time, he has been assigned additional responsibilities in regard to the establishment of priorities, selection and construction of boat-launching sites—a joint project with the Division of Fish and Game.

As we pointed out earlier, these duties are varied. As many readers of THE CONSERVATIONIST may not be aware of the extent to which the Conservation Department is now responsible for their administration, perhaps a thumbnail sketch of these new responsibilities is in order.

Boat Inspection

Under State law, all vessels used commercially (i.e., for which a fee is charged) and not inspected under Federal law by the U. S. Coast Guard, must be inspected yearly by the Conservation Department for compliance with State equipment and motor boat safety laws and regulations if they are to be used on State waters over which the Federal government does not exercise jurisdiction. Fees for this service, ranging from $5 to $25 per year, depending on vessel size, are charged.

Operator Licenses

State navigation laws also require that the operators, and in some cases, crew members, of public vessels be examined and licensed. In general, four types of licenses are issued:

The Joint Pilot and Engineer license is for use on small vessels requiring only one person for operation. An applicant for such a license must have experience in the operation of vessels in the same class as the public vessel he intends to operate. He must have general knowledge of small boat handling, engine operation, the New York State Navigation Law, the use of safety equipment and the waters upon which the vessel will operate.

Applicants for either a Pilot or Master license must have thorough knowledge of seamanship, ship handling and piloting on the waterway for which the license is intended. He must have satisfactory experience as determined by the Inspector.

An applicant for an Engineer license must have thorough knowledge of marine engine and auxiliaries which he intends to operate. This knowledge must include maintenance operation and repair. He must have satisfactory experience as de-

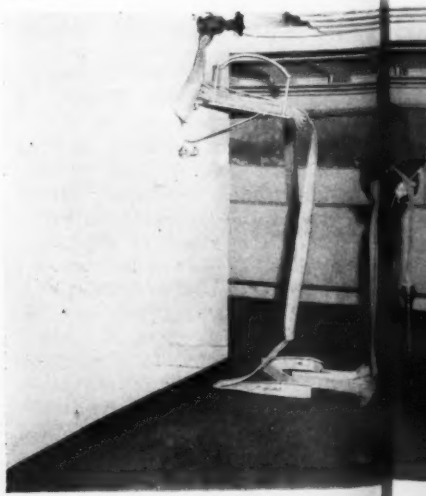
Conservation Department's Marine Service Activities

Subject	*Required of*	*How to Obtain*	*Fee*	*Remarks*
Certificate of Inspection for public or commercial-use vessels	All owners or operators of vessels in use on non-Federal inspected State waters	Write for application to State Conservation Department, Division of Motor Boats, State Campus Site, Albany 1, N.Y.	According to vessel size or tonnage. $5 to $25. Annually	Physical inspection of vessel required. Annually
Licenses (State Waterways) 1. Master	Operator of public or commercial-use vessels	"		
2. Pilot	Pilots of large public or commercial-use vessels	"		
3. Engineer	Engineers of large public or commercial-use vessels	"	Original $5 Renewal $3	Written examination, plus operating exam. required in some cases
4. Joint Pilot and Engineer	Combined license for operators of small public or commercial-use vessels	"		
Regatta Permit	Sponsors of regattas or marine parades on other than Federal waters	"	None. Insurance Premium of $5.71 per regatta. however	Special provisions on seasonal regattas and upstate Federal waters
Navigation Aid Permit	Person or organization placing navigation aid (buoys, etc.) on other than Federal waters	"	None	Must comply with State system and standards
Mooring buoys and other floating objects permits	Person or organization placing buoy or object on other than Federal waters	"	None	Must comply with State systems and standards
Town and village navigation regulation or ordinance approval	All towns and villages in New York State before ordinance becomes effective	Submit proposed ordinance to State Conservation Department, Campus Site, Albany 1, N.Y.	None	Should conform generally with State Navigations Laws

Check-up in the wheelhouse

Are lifebelts properly stored?

Is firehose O.K.?



Making sure fire extinguishers are in working order

—And in good condition?

Is all in order in the engine room?

termined by the Division's Inspector.

The minimum age requirement for license on vessels of 100 tons and under is 18 years. For vessels over 100 tons the minimum age requirement is 21 years.

Licenses can only be issued to citizens of the United States. A fee of $5 is charged for the initial license and $3 for annual renewals.

Permits

Present State law requires that no floating object or navigation aid be placed in State waters without a permit from the Conservation Department. Because of the need to provide warning of hazards, many individuals and organizations voluntarily undertake to construct, place and maintain navigation aids. Permission to do so is secured by writing the Division of Motor Boats for a permit application. After return of the completed application, an investigation is made and if the results are favorable, the permit is issued. While the State does not bear any of the costs connected with this voluntary program, liability insurance is provided to protect those who undertake to provide needed aids. There is no fee for navigation aid permits.

If a regatta or marine parade, marathon or race is to be held on any waters which are not under Federal control, permission must first be obtained from the Conservation Department. On Federal waters within the State (usually upstate), the Coast Guard at times recognizes a Department regatta permit in lieu of a Federal permit. Applications for regatta permits must be submitted 15 days in advance of the event. While there is no charge for the permit, a fee of $5.71 is required with each application. This fee is used to pay the cost of liability insurance which is required for each marine event.

Other required permits include special anchorage area and mooring buoy permits which may be required under certain circumstances on State waters only.

Approval of Ordinances

The 1960 legislature amended the town and village laws to provide that no town or village ordinance regulating pleasure boating would have the effect of law unless it first receives the approval of the Conservation Commissioner. Proposed ordinances are now submitted to the Department for initial approval. Much of the initial investigation of these proposals is first undertaken by the Division of Motor Boats, Marine Services Section.

Bioluminescence

The Phenomenon of "Cold Light"

by Howard J. Dean, Conservation Biologist, N.Y.S. Conservation Department

THE ability to produce light is very widely distributed among animals, fungi and bacteria. This "living light" has been observed for centuries and many of the early explanations of this phenomenon were fantastic. The first records indicate that Aristotle (384-322 B.C.) was probably the first to mention the light of dead fish, flesh and wood. Pliny (23-79 A.D.) also wrote on this occurrence of glowing objects. In 1667, Robert Boyle showed that air was necessary to produce light from these sources, but even Ben Franklin is quoted as believing that the light was due to some electrical origin—he later changed his opinion.

It can be seen that luminescence (the emission of cold light) has long been a fascinating subject of study. Among the contemporary workers in this field, Dr. E. Newton Harvey, late of the Biology Department at Princeton University, is outstanding for his extensive studies over a period of forty years. Professor Harvey died in 1959 after having written 90 of the more than 500 scientific papers on luminescence. His very readible book, "Living Light," is highly recommended to those who would care to pursue this subject further.

One of the first questions to be settled regarding living luminescent organisms is whether the species is truly self-luminous or whether such light comes from bacteria associated with the animal. There have been many false reports of luminous forms. Many non-luminous species may become infected with luminous bacteria or fungi so that their light is, in reality, only secondary. Another common mistake easily made is to confuse iridescence with luminescence. The phenomenon of the "purple arcs," the flashing of flowers, St. Elmo's fire, luminescent raindrops, will-o-the-wisp, luminous sweat and many others are not true animal light.

Luminescent Animals

A survey of the animal kingdom discloses at least 40 orders containing one or more forms known to produce light and several other orders where this ability is doubtful. Luminescent forms are reported in eleven of the generally accepted seventeen phyla of animals from the Protozoa through the Chordata. There appears to be little or no general pattern for a capacity within these groups to produce light; it may occur in one species of a genus and be absent in another. Luminous animals are practically all either marine or terrestrial. The only known examples of fresh-water forms are certain bacteria, a recently described fresh-water limpid from New Zealand and an aquatic glowworm. Among light-producing marine animals, the great majority are deep sea forms and it is here that the development of true luminous organs of a complicated nature are most pronounced. There are also light-producing forms to be found at the surface of the seas. A good example is the common protozoan *Noctiluca* which (with other species) is the cause of the light seen in the wake of a ship at night. Not only the adults, but also the embryos and eggs of some animals are luminous. Because luminous forms are found scattered all over the evolutionary tree from protozoan to fish without any evidence of direct evolutionary descent, many authorities believe that luminescence has arisen independently in these animals, probably as a result of slight chemical changes in the animal cells.

Luminescent Plants

The plant kingdom has only two luminous groups—bacteria and fungi. These bacteria are no different from other forms except for their ability to luminesce. They generally live on meat, but some live in ordinary pond water and others are marine and require a high salt content. Luminous bacteria are of the most interest because they are generally parasitic (some are saprophytic) and may lead to the host's death. Luminous wood or "fox-fire" is familiar to nearly everyone. This light actually comes from tiny threads of cells of a fungus which spreads throughout the wood. The light from true fungi is quite similar to that of bacteria, that is, continuous and independent of stimulation. And herein lies the explanation of the Indians' tales of "ghost bears." These apparitions, glowing eerily as they ambled through the night-shrouded forest, were thought by the Indians to be of the spirit world. Actually, they were hale and hearty, flesh and blood bruins, their coats well sprinkled with luminescent wood from rotten logs where they had been rooting for fat grubs and other bear goodies.

There are several ways to classify luminescent organisms, but probably the most common way is to determine whether the light producing material is burned within the cell where it is formed and is thus called intracellular or whether it is secreted to the outside and burned and known as extracellular. Animals with intracellular luminescence have the most complicated light producing organs.

Light-producing Protozoa

Among the Protozoa, many luminous forms are known. Many of the Radiolaria, which extract silicon from sea water and build it into beautiful and intricate skeletons, are luminescent. Another well known Protozoan is the dinoflagellate Noctiluca, which means "night light." This name was given to the Roman goddess, Luna, whose palace was always lighted at night. Ships may travel for miles through water filled with them, a phenomenon that makes the wake of the ships very beautiful to watch. A great many dinoflagellates are luminous and the so-called "red water" conditions that occur frequently in tropic and temperate seas are dense populations of these protozoans.

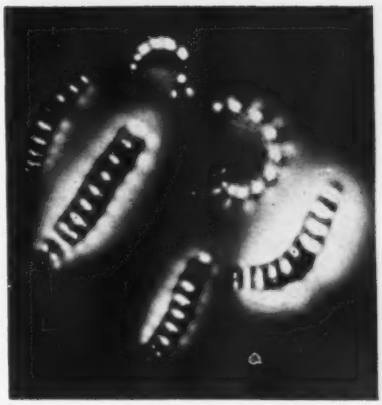
Jellyfishes, Etc.

A number of the jellyfishes and sea pens contain numerous light producing forms. Usually, the whole surface of the organism lights only on stimulation and, when handled, one form sheds a layer of mucus which sticks to the hand. This mucus contains granules whose breakdown is accompanied by a burst of light. The sea pens are colonies of animals which, when stimulated, activate a wave of light which passes from one to the other. The comb-bearers are probably all luminescent but only in complete darkness; any form of outside light prevents their lighting. These animals respond to stimuli, fatigue on repeated stimulation, but recover their power after rest.

Luminescent Worms

Only a single luminous nemertean worm has been described and this was not known until 1939; this worm is luminous all over except for the tip of its head. In the Annelida (segmented worms), luminescence is restricted to terrestrial oligochaetes and marine polychaetes. Luminous earthworms are found in every part of the world. There are eight groups of marine forms; some show general luminescence and in others it is restricted to local spots or organs. In one striking form, the whole worm glows and even the larvae are luminous. The fireworm of Bermuda is another common luminescent marine worm; this form swarms in large numbers in relation to phases of the moon.

Glowworms in the light



And in the dark

Arthropods

Luminous species of arthropods are numerous; chiefly, the crustaceans and insects, rarely, the myriapods (centipedes) and arachnids (spiders). There are many known luminous crustaceans found in both Arctic and temperate seas. Many are blind so the function of the light is unknown. During World War II, the Military Institution of Japan was planning to utilize the residue from sea fireflies for light for night reading. However, the powdered residue putrified rapidly in tropical countries and so was probably not very useful. A fresh-water shrimp, found in Lake Suwa and widely distributed in Japan, becomes luminous because of infection by luminous bacteria and the entire body will shine brightly. Because of the rare beauty of these shrimp as they mass and luminesce on summer nights, their destruction is prohibited by the government. There is a large spider, 20 inches in diameter, found in the Indian Ocean which is luminous on the under side of the legs. It is not definitely known whether there are other truly luminous spiders; some have been described but have never been caught for study.

Light-giving Insects

Among the insects, only the springtails, flies, moths and beetles appear to contain self-luminous forms. The best known of these groups are the beetles of which the click beetles and fireflies

possess intracellular luminescence. Glowworms may be either the larvae of beetles or wingless female beetles; some of the glowworms are aquatic but most are terrestrial. The Cucujo beetles of the West Indies were used by the early natives in place of candles and were also worn as decorations by the men and women. Our common firefly has ventral luminous organs on the last segment of the abdomen and even the egg and pupal stages of this insect are luminous. The synchronous flashing of fireflies has caused much excitement and study and is still mostly a mystery. This synchronous flashing occurs more commonly in tropical countries; it is rare but it does also occur in America. World War II veterans of the South Pacific area may have observed this phenomenon of synchronous flashing. Generally, several large groups of fireflies attach themselves to a tree and each group flashes as one, the flash going from one group to another in rapid succession. Most American fireflies spend the day hidden in the leaves but come out at dusk; generally, only the males fly; the females, being wingless, remain in the grass. Each species has a characteristic method of flashing. In Japan, fireflies are relegated (by some) to the realm of blessed ghosts of slain warriors and, in some places, they are also used for light in lanterns. In parts of America there is an old superstition that when a glowworm appears in one's path it denotes brilliant success and should never be stepped upon.

Mollusca

Luminous species of the group Mollusca are rather rare, but among this group the squids show the highest development; they are fundamentally luminous animals. They have developed the most varied methods of lighting, from harboring luminous bacteria to the most complicated lanterns. In one squid there is a luminous organ which opens into a cavity and expels a luminous cloud when disturbed. In another, as many as four different colors are produced by the various luminescent organs present. In the starfish group of marine animals only the brittle stars are luminous. When disturbed the arms and legs of the animal light up, but no secretion is discharged.

In the phylum Chordata, which contains animals with backbones, the Balanoglossids (primitive worm-like animals), tunicates or sea squirts and fishes contain luminous forms. Balanoglossids, the ancestors of the vertebrates, glow all over when disturbed. The tunicate "fire-cylinder," is a well-known luminous form. This animal is a colony of small tunicates each with luminous cells at the shoulder; when one individual luminesces on stimulation, a wave of photogenic activity spreads to the rest of the group and even to other colonies nearby.

Fishes

There are two groups of fish that contain luminescent representatives, the elasmobranch or cartilaginous fish and the bony teleosts. Most of these fish are found in the depth of the sea. Luminous fish are divided into three groups depending on the method of light production and type of luminous organ. One group is associated with luminous symbiotic bacteria.

In the Banda Sea there are two East Indian fish each with a special light organ under the eye in which luminous bacteria are always present. In one, the continuous light emission of the bacteria can be shut off by a screening device of the fish (like an eyelid). In the other, the light organ is attached by a hinge that can be turned over so that none of the light-emitting surface is visible.

Another group have well-developed luminous eye-like organs with lenses and pigmented cups. A luminous flying fish has been reported from this group but most are found in deep water.

The last group are those fish with indirect emission luminous organs; i.e., the gland lies inside the fish body and the light is reflected out through a translucent area of muscles. There are many species in this group of relatively shallow water marine fish. Despite the formidable structural array of light organs of fish, descriptions of the light are few and not very startling.

Mechanics

Living light (bioluminescence) is an example of chemiluminescence in which special compounds manufactured by the animals are oxidized to produce light. The actual light-yielding reactions are difficult and complicated problems which have received considerable study. Progress has been slow and much is as yet a mystery. Animal luminescence is not a vital life process and living protoplasm is not necessary for light production. It has been known for years that luminous cells or tissues can be dried with a cessation of light and that upon the addition of water will luminesce again. Dried firefly tails can be purchased for certain bio-chemical tests. With few exceptions, every luminous organism is dependent upon free oxygen for light production. Light production in different animals differs in detail. Many organic compounds are capable of luminescence when oxidized under proper conditions. The common and probably the best understood process found in beetles, molluscs, worms and in a few others, is the luciferin-luciferase reactions. Luciferin, a biochemical from which adenosine triphosphate (ATP) has been isolated, and luciferase, an enzyme, when combined, produce light. This basic reaction can be described as follows: Luciferin + luciferase + ATP + a magnesium ion + oxygen will result in light production + by products.

Only if luciferin and luciferase of closely related forms are mixed will luminescence occur and the light produced may vary from yellow, to violet, blue, green or red depending upon the species. That animals emit "cold light" is amply verified but some heat is produced; cold light is only relatively cold. The luminous efficiency of the firefly is very high as compared with an electric light bulb which radiates a great deal of heat. Commercial lighting has, in some cases, turned from incandescence to luminescence, thus adopting the method of the firefly.

Among animals, the production of light is not a continuous process; the ability to control their light is a fundamental characteristic. Continuous light generally indicates the presence of bacteria or fungi within or upon the animal. The means of light control can be placed in three types: (1) A neuromuscular mechanism, (2) by direct nerve or endocrine excitation and (3) by excitation of the luminescent cells which results in the photogenic substances being able to interact. This latter type occurs intracellularily in fireflies, Noctiluca and some fishes. Many of these processes are poorly understood at the present time and authorities differ somewhat in their explanations. The significance of light production is often not obvious, but it is likely that some survival value is commonly associated with this function. One such function may be the luring of food, another as a protective device by warning or frightening enemies or by concealing the animal by ejecting a luminous cloud as does the deep sea shrimp, or by serving as a warning to its fellows, thus permitting their escape. Probably the best explanation to date is that of serving as signals for bringing the sexes together for mating. This has been well established for fireflies and for Bermuda fireworms.

Dr. Frank H. Johnson of Princeton University has this to say regarding luminescence: "A useful tool in investigations of fundamental problems that apply to all living things, it can be used in studies of the effects of drugs, heat and cold and antibiotics on organisms as a whole or on their various life processes such as respiration, reproduction, and digestion."

The Youth Camp Program in New York —A Progress Report

by **C. E. Boone,** Superintendent, State Forests

BEGINNING in 1956 with an experimental camp at Pharsalia in Chenango County, the Youth Camp Program at the end of the 1961 calendar year is expected to consist of six camps operating on the State Reforestation lands in New York. Since, by law, no activity which would tend to modify the "forever wild" character is permitted on Forest Preserve lands, these camps are located on State lands outside the Blue Line where it is possible to formulate a year around work program of constructive conservation work for each camp.

Conservation-Correction Camps

The Department of Correction, as authorized by Chapter 600, Laws of 1955, has established four camps as follows: Camp Pharsalia, Chenango County—80 man capacity, (1956); Camp Monterey, Schuyler County—80 man capacity, (1958); Camp Summit, Schoharie County—100 man capacity, (1961); Camp Georgetown, Madison County—100 man capacity, (1961).

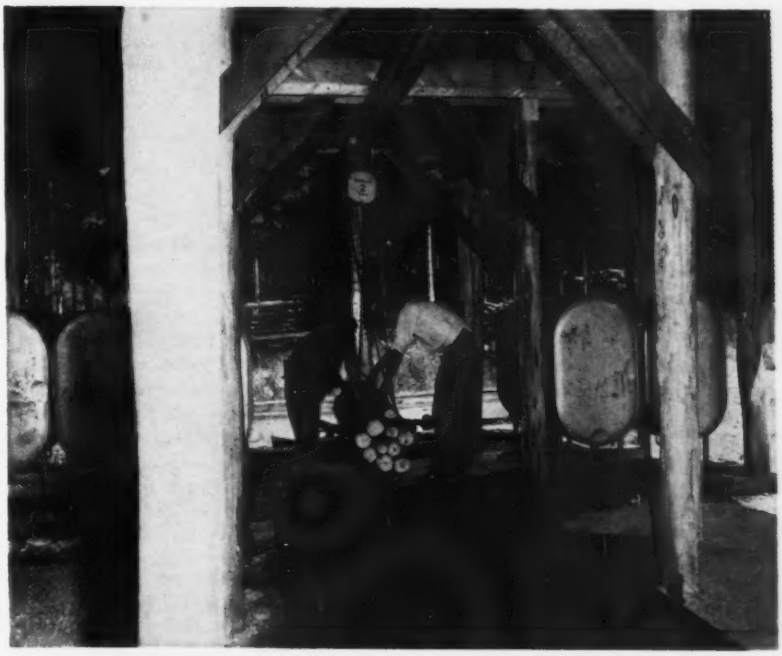
Youthful offenders, assigned to these rehabilitation camps are between the ages of 18 to 25 and have volunteered for periods averaging 8 to 10 months for work on conservation projects on public lands. These campmen normally are recruited from volunteers from the Department of Correction's reformatory type of institutions.

New York State's Correction and Conservation departments share the responsibility of working toward the objectives of the camps which are: (1) Rehabilitation of young men to enable them to fit into and be a benefit to our society; (2) development of manual skills by on-the-job training on various work projects of a conservation nature; and (3) development and rehabilitation of Reforestation lands to provide a continuing supply of forest products, and the implementing of a program of land use embracing long range, compatible conservation practices, including the development of public recreational facilities and hunting and fishing opportunities.

The Correction Department has the responsibility of providing funds for the building of the camps in accordance with

Camp Pharsalia pruning crew at Bowman Lake campsite

Chemical dipping tank for treating polestock



approved plans provided by the State Architect's office and providing for the maintenance, security and rehabilitation of the campmen. A complete staff is provided for administration of the camps and the carrying out of counseling and security measures. The Conservation Department provides the work program, technical forestry staff to supervise this work program and tools and equipment required to carry out the work.

Youth Camps

Not only is the Conservation Department, through the Bureau of State Forests, working co-operatively with the Department of Correction but under Chapter 881, Laws of 1960, a similar program was authorized with the newly-created Division for Youth in the Executive Department. This Division is authorized to establish Youth Opportunity and Youth Rehabilitation Centers for the rehabilitation, treatment, education and guidance of youths between the ages of 15 and 17 years whose behavior indicates that they will benefit from the programs at these centers.

The Youth Opportunity Center Program provides for the voluntary enrolling of a youth without court procedure upon the written consent of a duly authorized agency and with the parents' consent.

The Rehabilitation Center Program provides for the assignment of a youth by the courts pending final disposition of his case or as a condition of probation following adjudication of his case.

These Centers may be of three types:

1—The Youth Camp Program

These camps, of 60 man capacity, may be of either the Rehabilitation or Opportunity class. They will be located on State Reforestation lands in localities as near to centers of population as an extended year around work program will permit. Professional staff from both Departments will carry out respective counseling, educational and work programming in a manner similar to that with the Department of Correction Camps. Since the age group is of the 15 to 17 year classes, educational programming will play a large part in the overall rehabilitative planning. A work program based on conservation projects will round out the camp schedule.

2—"START" Program (Short Term Adolescent Resident Training)

This activity will establish Rehabilitation Centers of 20 man capacity located near large institutional type facilities or near limited concentrations of State Reforestation acreages where sufficient work is available of a year around nature to support such a facility. The Conservation Department will function in this phase only when the work program includes projects on State lands under the jurisdiction of the Department.

3—Youth Home Program

This program will establish centers for youths who are able to function in their own community but need a different living situation. Youths in this program will remain within their own communities and will continue to attend their local schools or in their current employment. This program will function chiefly in the larger metropolitan areas and will apply to both boys and girls. As a result of the nature and locale of this activity, the Conservation Department will not participate in this phase.

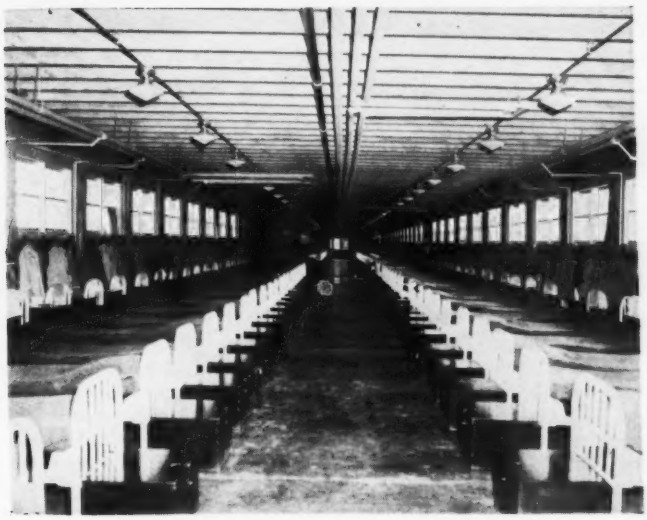
Under the Youth Camp Program phase, the Division for Youth in the State Executive Department is planning to establish a Youth Rehabilitation Camp in the Town of Rensselaerville in Albany County which is expected to be operational by January, 1962. Also, about a month behind in all stages of planning, is the establishment of a Youth Opportunity Camp in the Town of Great Valley in Cattaraugus County. The establish-

Top left—noon mess break at Camp Summit

Top center — Dam construction Bowman Lake, Camp Pharsalia

Lower left — Ball field under construction at Camp Summit

Top right — Camp Pharsalia crew picking up stone for road construction at the Bowman Lake public campsite



Lower right—Interior of dormitory at Camp Summit

ment of these camps will provide a source of manpower for the development of needed facilities on State lands in areas where the current available funds are insufficient to meet public demands.

In order to provide for the fullest development and utility of the State Reforestation lands, the yearly work programs of the camps will contain projects included in the long range planning as set forth in the Forest Inventory and Management Plan for the State Reforestation lands within the working radius of each camp. Since a well planned network of primary and secondary roads is fundamental to the management of forest resources and as access for hunting and recreation, a portion of each year's work program will be devoted to expanding this type of facility. The increased demand for family style picnicking and camping will be partially met by development of water impoundments and day use and camping facilities at locations determined to be best suited for this type of development. Similarly, silvicultural work in forest stands will be carried out on a yearly basis in a manner recommended in the Forest Inventory and Management Plan for the various Reforestation Areas. Camp projects to enhance the attractiveness of the camp area and to provide inclement weather work will be included in the program and will assist in developing aptitudes that will help a campman secure employment on his release.

The conservation and rehabilitation of natural resources is a prime objective of the programming of the Conservation Department. The rehabilitation of human resources is a prime objective of the Department of Correction and the Division for Youth of the Executive Department. The well grounded understanding of co-operation among these agencies will provide a program of service wherein our youthful human resource shall be better equipped to assume its rightful responsibility in our society and the natural resources of land, water, forests and wildlife shall be developed in a more productive manner for all.

The National Wildlife Federation

by John Douglas Bulger, Northeastern Field Representative

"WHEN are you fellows going to do something about the duck season?"

As a field representative of the National Wildlife Federation, and a frequent guest-participant at statewide sportsmen's meetings, I've learned that this question rates high on the priority asking list of those who mistakenly assume that the Federation shares unenviable responsibility with the U.S. Bureau of Sport Fisheries and Wildlife in setting seasons and bag limits for waterfowl. We're not that easily cornered.

After waiting for the sympathetic grumble of discontent to abate, I explain: "To understand what the National Wildlife Federation is, first we should understand what it is *not!*

It is not connected in any way with the Federal government and, therefore, to answer your question, we don't set the duck season!"

A moment's silence. "Well, what *do* you people do then? Hunt'n fish for a living?" Good-natured laughter—tinged with more than a trace of envy.

A good question! Sometimes two days go by without hearing that one. It's a pleasure to answer it.

The National Wildlife Federation is a non-government, non-political organization devoted to creating and developing an awareness among the people of our nation of the need for wise use and proper management of our natural resources: Soil, water, forests and wildlife. Quite a mouthful? Right! But, then, the Federation is quite an organization. In fact, it's probably the biggest conservation organization in the world! Its membership, *per se*, is restricted to one member or "affiliate" in each state. This affiliate must be statewide in representation, with fundamental interest in natural resource conservation. Through these affiliates, the Federation represents more than 2 million people. Or, look at it this way—NWF is the conservation club at the national level.

Geographically, the Federation is divided into thirteen regions, covering the United States. One director from each region is elected for a three-year term at the NWF's annual meeting. This meeting, held each year in conjunction with the North American Wildlife Conference, is actually the governing body of the organization. Between annual meetings, the Board of Directors (one from each region) handles policy matters for the Federation, while day-by-day business is conducted by the Executive Director and his staff.

NWF was organized in February of 1936 at the First North American Wildlife Conference, called by the late President Franklin D. Roosevelt. The President charged the conference to create a national civilian group which might co-ordinate all conservation activities and present a united conservation front. In 1937, at the second Wildlife Conference, constitution and by-laws were formally ratified, and the National Wildlife Federation became an institution in the conservation field.

A recent NWF publication notes that: "It did not take long after the organization of the National Wildlife Federation to come to the gloomy conclusion that

enthusiasm would not pay the rent, buy stationery, postage and all the other things needed to run even a small office." But despite the Federation's share of vicissitudes, foundered hopes and shattered dreams, it survived to become one of the most potent forces on the conservation scene. One whimsical reason for its survival, in the early, trying days, was the suggestion of an anonymous Kansan who wrote: "Why don't you paint some wildlife pictures and have them printed on paper with glue on the back and sell them to lovers of wildlife all over the country?" Well, why not? "Ding" Darling, who might be called the Founding Father of the Federation, in a typical burst of energy, grabbed a brush and started painting the first "Wildlife Stamps." Each year since then, NWF has sent a new issue of Wildlife Stamps through the mail to people interested in conservation everywhere. And, each year, response to this program has provided income to finance Federation activities.

"Very interesting," yawned a #16 Dry Fly type in the front row. "But what do you DO?"

"All right, I was just coming to that." The National Wildlife Federation pursues its goal, "stimulating public awareness of the need for conservation," largely through education. An education program without a publication is like a launching pad without a missile. So we mail out publications, more than half million free each year!

Take *Conservation News*, the semimonthly about current events in conservation. You'll find it on the desk of wildlife professionals everywhere. Moreover, it's read by over 50,000 Girl Scouts, farmers, mechanics, pilots and just plain people. This line of communication makes us a truly grass-roots organization, and NWF is proud of it!

Conservation Report is a factual weekly sheet on the progress of conservation legislation in Congress. You'll find this in constant use by those whose position in life demands close touch with legislation affecting our natural resources. Is the *Report* used? A congressman called our office one day in a very vexed voice: "Do you have an extra copy of the *Conservation Report?* I've mislaid mine and with this hearing (on conservation matters) coming up, I'm lost without it!"

"Certainly, Senator, shall we send it?"

"No, I'll send over after it immediately!" And he did!

These are just two of the many useful publications which NWF issues regularly. A complete list of all Federation publications is free on request to our Washington, D.C., office, 1412—16th St., N.W.

A highly specialized staff is part of the education program. Not only in Washington, but in every corner of the country, a Federation representative may be found defending our natural resources. A field staff keeps track of conservation problems out where they occur, in the soil and water, the fish and wildlife environment. Although NWF's staff is versatile, pressing conservation problems occasionally demand selection of specialists. For example, in the Prairie Provinces, under a program of government-subsidized drainage, duck-factory potholes are disappearing like puddles of water evaporating after an August shower. In an effort to salvage the remaining wetlands, the National Wildlife Federation has added to its staff a specialist on wetlands management.

A more formal part of the Federation's education effort is the scholarship-grant program. Hundreds of students and teachers have done graduate work, attended workshops, pursued research through annual financial assistance programs.

Frequently, the National Wildlife Federation is asked for advice on constructive legislation in the conservation field. In fact, a lawyer on the Federation's staff drafted the Pittman-Robertson Act, which has been possibly the biggest shot-in-the-arm wildlife conservation has ever received. The Federation was equally active in helping draft a companion piece of legislation, the Dingell-Johnson Act, which does for fisheries management what the P.-R. Act does for wildlife.

Wildlife Week, another educational activity, is an annual potent reminder that wildlife continually needs intelligent refuge, management and understanding. Like so many NWF activities, this one would fall flat without the active and continued co-operation and support of the state affiliates.

In THE CONSERVATIONIST *for December-January, 1960-61, we carried a review of "The National Wildlife Management Institute"—the first article of an informally scheduled series to acquaint our readers with the history, the programs and objectives of national nongovernment conservation organizations—organizations devoted to the proposition that only through the intelligent safeguarding and management of our natural resources shall we draw the creative strength to survive as a people and a nation. The accompanying article on the National Wildlife Federation is the second in this series.—Editor*

Federation sponsored teacher group studies pond life

Down roads too long to follow in these pages, the National Wildlife Federation pursues its many goals. Encourage sound wildlife management, discourage political interference, protect watersheds, stop pollution, preserve wilderness beauties—do the job, don't stop. For soil erosion works seven days a week and pollution doesn't go to town just on Saturday night!

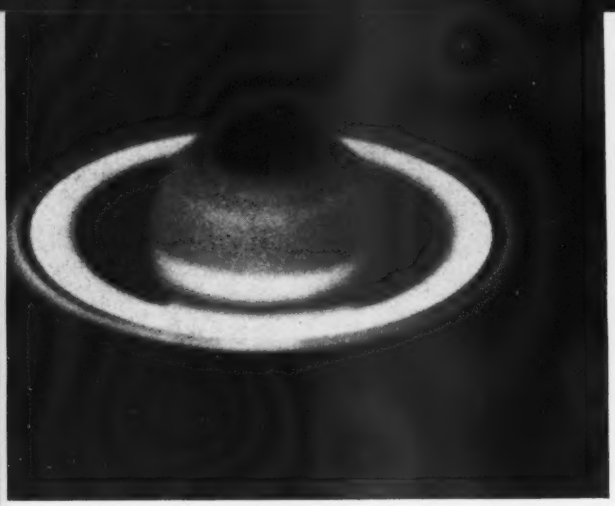
And always promote public awareness! For the path to better resource use sometimes appears a gloomy, crooked trail. But often a hidden, wide way is there, if we but illuminate the scene with the lamp of public understanding.

In addition to its proven programs, NWF constantly experiments with better ways to get the job done. Leadership training clinics are being started for affiliates. In-service training sessions give NWF staff members a first-hand look at conservation problems in many areas. Conservation education by television has a tremendous potential we are just beginning to tap. And, we mustn't forget to do some "federating," too. A typical effort in this connection is the annual conservation conference. Here, NWF acts as host to other conservation organizations. Held at Washington, D.C. each December, these fact-finding sessions attract top talent from resource-minded groups throughout the country. These gatherings are held in the Federation's new headquarters at 1412 Sixteenth Street, N.W., Washington 6, D.C. Plans for this building began developing in 1957 when the estate of the late Louise Ayer Hatheway of Boston, Massachusetts, awarded the Federation a generous grant for the purchase of land for a new headquarters in "downtown" Washington. Following the grant, the Federation undertook a successful building fund drive which permitted construction of the beautiful but business-like headquarters it enjoys today.

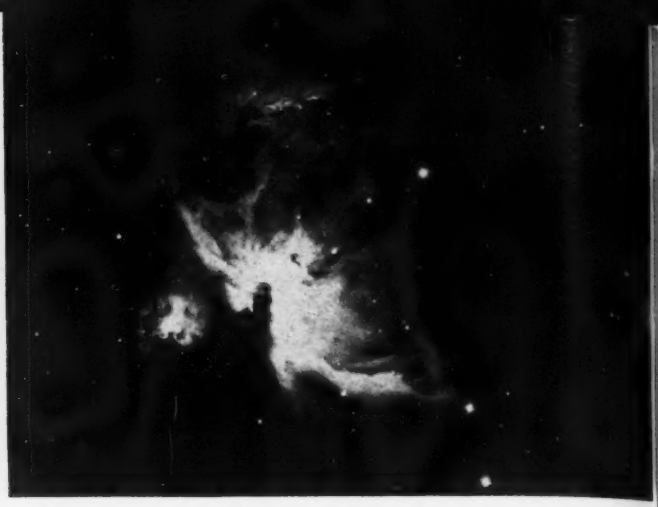
"So that's the story," I concluded. "If you want more on this subject, send to NWF for our free publication, *This We Believe.*

"Now are there any more questions?"

"Yuh!" A figure stirred to life in the back of the room, and lurched to his feet. "When are you fellows going to do something about the duck season?"



Saturn and its rings



The Great Nebula in Orion

A Hundred Billion Galaxies

RALPH WALDO EMERSON wrote that "If the stars should appear one night in a thousand years, how men would believe and adore." Yet the stars are no less fascinating for appearing every cloudless night. If this requires substantiation, there are thousands of New Yorkers willing to testify. Ever since October, 1957, these people have been coming two Sunday evenings a month in autumn, winter and spring and once a month in summer to the free star gazing sessions at Jones Beach State Park, facing the ocean and sky from the south shore of Long Island. When bright Sirius sparkles beckoningly above the winter horizon, there may be more than a thousand persons blowing frosty breaths, pounding arms together and stomping feet on the boardwalk as they wait to peer through telescopes pointed into the expanding universe.

Even when rain or light snow has been falling, some 150 "regulars" can be expected to track into the parking field bathhouse, strew jackets and coats over the chairs, thaw themselves with frankfurters and steaming coffee from the counter, and listen to the evening's discussion which may be about the origin of this planet on which we are being spun like a top, swung around the sun, orbited about our Milky Way Galaxy (a round trip of 200,000,000 years) and hurled through space with our galaxy at perhaps millions of miles a second.

There is plenty of vastitude with which to expand the usual half-hour lecture when there is a cloudy ceiling. This, Percy M. Proctor is always prepared to do. Mr. Proctor, supervisor of the program and retired superintendent of the public schools in Babylon, gives a talk each time except in summer. Last season he explained the solar system, following with a series about the astronomer's tools.

He can make telescopes exciting when he injects his anecdotes about the men who developed them. He often turns aside from tracing constellations on his big charts to relate the ancient mythologies about these pictures in the sky. This testifies to his early career as an English teacher. In fact, the cardboard he continually holds with the evening's reference data about distances, diameters, magnitudes, has poems about the stars pasted on.

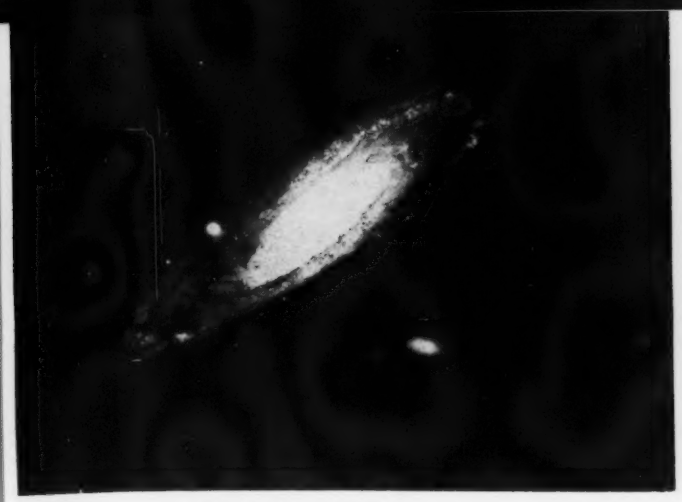
"There is something for everybody," Mr. Proctor says, whether for those seeking more scientific understanding of the universe or for those overwhelmed and inspired by its dimensions. Many enjoy locating the constellations. Others want to see the spectacles they have long heard about, such as the moon's craters and the rings of Saturn. A little boy, for instance, can get a squint at what appears to be a small reddish globe and tell all his friends at home he has seen Mars.

Once an assistant was training a telescope on Venus in its crescent phase. A woman peered in only to rear back indignantly, admonishing him that it was the new moon. After stretching backwards, eyes darting into every corner of the sky, she had to admit she could not find the moon. Occasionally the Jones Beach star gazers see Jupiter's four visible satellites strung out like racers poised at the start. Two weeks later they find the moons ranged in different positions on their track around the big planet.

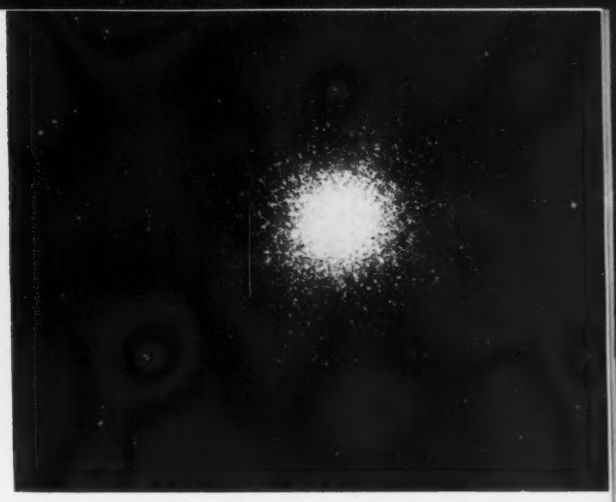
About the only ones avoiding kinks in their necks are the infants whose tiny attentions are focused on their bottles. It is not unusual to see a young couple, with the husband intent on what Mr. Proctor is saying while the new mother tries to hold on to a wriggling armful of blankets. Or you may see parents herding their half dozen or so youngsters into line behind a telescope. "It has been a revelation," Mr. Proctor says, "how much of a family activity this is."

He has homework for them if they take copies of each month's mimeographed calendar of coming celestial events—picturesque groupings of the planets close to each other or with the moon; occultations by the young moon when stars vanish or pop out from behind the dark portion; meteroic showers when the sky seems filled with "shooting stars;" and instructions how to see Venus during your lunch hour.

Some have assignments. These are the men who preside over the telescopes. Some had never looked through telescopes. The scarcity of amateur astronomers nearly precluded the star gazing at its outset. Joseph Lowery, assistant special events director, realized this when he urged the program as a good winter activity. The ten 2.4- and 3-inch telescopes were easily obtained. They were donated by Unitron Instrument Co., manufacturers of amateur telescopes in Boston, Mass. Abraham & Straus department store, Brooklyn, was willing to pay operators.



The Andromeda Galaxy



Globular Cluster in Constellation Hercules

Over Jones Beach

by Maxwell C. Wheat, Jr.

Percy M. Proctor was the cure-all. His reputation was well known through a weekly newspaper column on astronomy. He agreed to serve as lecturer. He enlisted his own assistants; science teachers and an enthusiastic janitor from his schools and, as Mr. Proctor put it, "the fellow who lives across the street from me, one on the corner and a couple of neighbors from the next block." Two of them have used their extra money to purchase binoculars and another is saving for a telescope.

The Thursday before each session they meet at Mr. Proctor's home for "rehearsal." Each becomes a specialist on a planet, "double star" cluster or nebula. He practices finding it through the telescope. He is given a card with facts to memorize about the object. When these assistants are not answering questions at Jones Beach as they man the telescopes, they also are learning from Mr. Proctor's lectures and his locating the constellations.

He does this from what could pass for a racing judges' stand in back of the bathhouse. He plays an automobile searchlight about the sky. The long narrow beam seems to be a brush stroking in the mythical birds, fishes, animals, dragons and the great heros like Hercules, Orion and Perseus, which the ancients pictured in the stars so many nights ago. Mr. Proctor will refer to the stories as he maneuvers the searchlight. "See," he says, "there's Perseus coming across the sky with his winged horse Pegasus."

As the weeks go by, the Jones Beach gazers become familiar with the individual stars and their names: Aldebaran, Procyon, Capella, Albireo, Altair, Sirius, Betelgeuse (pronounced Bett-l-jews). These names, derived from the old Persian, Arab, Greek and Roman languages, sound poetic as Mr. Proctor sometimes tries to make them heard above the winter wind rustling into the loudspeaker and the sound of ocean surf.

People become more fascinated as they begin to realize that each of these points of light are suns—that is, spheres of hot gases like our own close star (which we call "the" sun) that provides us with its sustaining energy and warmth. Replace it with one of the hotter blue-white suns we see, and the earth would begin to take on the crisp, molten character of a marshmallow.

However, substitute one of the reddish appearing stars and it would envelop the sun and most of the planets. In fact, Ras algethi, the biggest sun visible to the naked eye, would cover the entire solar system. This star is thought to attain a diameter of two billion miles. But unless we were close to the center, we would not realize we were inside one of these suns. That is because the gases of these "red giants" are far more rarefied than the air we breathe. Some of these big stars swell and shrink. At its smallest, Betelgeuse, the bright red star in the hunter Orion's shoulder, is equal to about 360 of our suns. A half dozen or so years later you could stuff a hundred more of our suns in it.

Betelgeuse pulsates irregularly. But you could actually tell time by some of the variable stars that expand and contract over exact intervals. The time lapses for many have been determined for astronomers by amateurs maintaining continual vigilances. The most prominent variable is Delta in the constellation Cepheus near the North Star. Compare Delta with a neighboring star. You can notice that the variable diminishes or brightens in 5.4 days.

Mr. Proctor says you can do even better with the slow wink of nearby Algol—the "demon star" as the superstitious ancients called it. If you begin checking at the start, you can see that Algol changes between maximum and minimum brightness in five hours. Pulsation is not the cause. You are viewing the eclipse of one star by a smaller one revolving around it.

What we see as a single star actually can be two or several suns. Binoculars might resolve the star into a "double." Telescopes could "split" each of these. Then you would have four. Special observatory instruments such as spectroscopes, might show some of these to be "doubles." All of them would be linked in small, complicated systems. The member stars would be revolving around each other and around common centers of gravity like the ends of a twisting dumbbell. The various orbits would require days to centuries to complete.

The North Star is such a system of intertwined suns. Two stars can be seen in a good telescope and the brighter of the pair is itself a triple. Some 40 per cent of the stars we see are in multiples. Then there are the coincident "doubles." These are unrelated stars lying in the same line of sight from earth. Many of these can be "separated." With all these

"doubles" you can understand why amateurs like to spend time "splitting" the stars. It certainly is rewarding when you get such a pretty orange and blue-white "double" as Albireo in Cygnus' crown.

The constellations are guides for other beautiful sights. Cygnus, Cepheus, Cassiopeia, Perseus, Sagittarius and Scorpio are signs for what we see as the Milky Way's path around our sky. Our sun and its planets are about a third of the way from the back of the celestial theater-in-the-round that is our galaxy of perhaps a hundred billion stars.

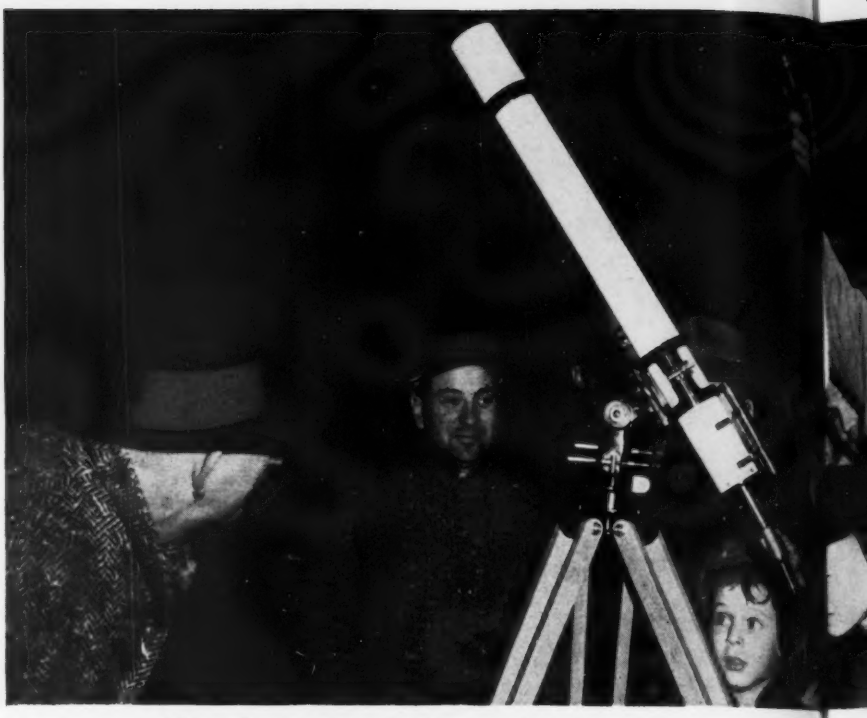
We are not even close to stage center. That is the densely star-populated nucleus. It is what we are looking toward when we stretch our necks up at the foggy light stream we call "The Milky Way." If you look over your shoulder you see areas where there are only a few stars. Then you are looking through the sparsely populated outer regions toward the galaxy's edge.

Scanning this theater, you find some brilliant clusters of tightly grouped stars. You may be familiar with the Pleiades, the seven stars that appear like a tiny dipper. Binoculars will show a score of stars in this cluster. Other good binocular clusters are the Hyades, the Beehive and the Double Cluster of Perseus. The Perseus clusters are so close they can be seen in the same field. Through binoculars you get the effect of looking deep into spacial pools into which handfuls of effervescent jewels have been scattered closely.

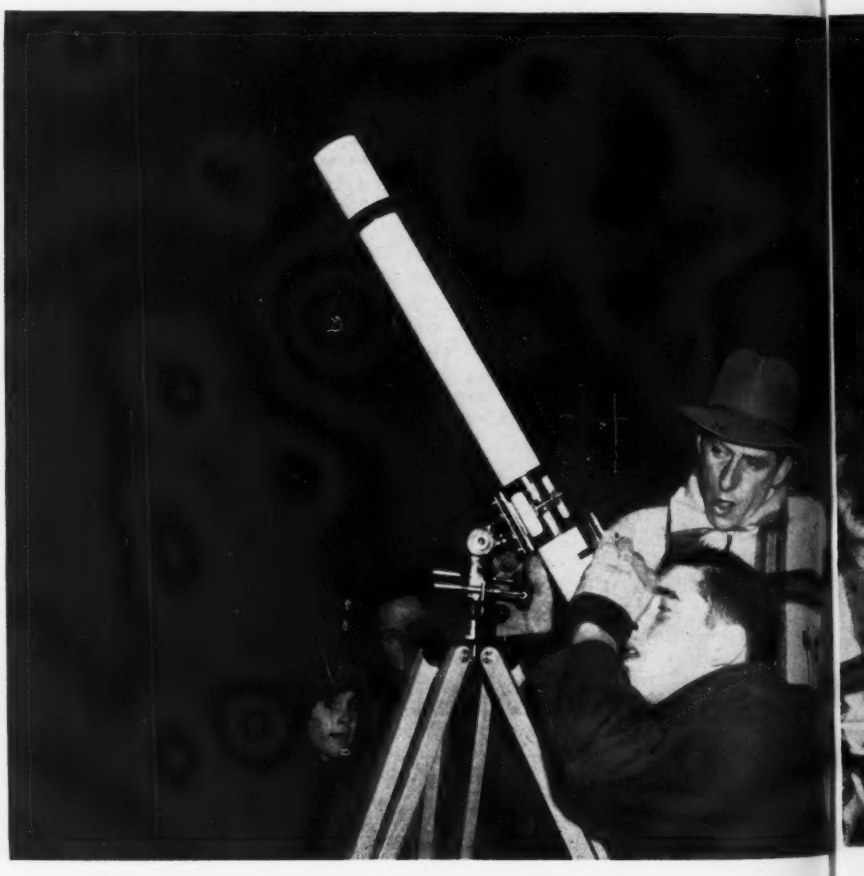
You can also find what appear to be puffs of smoke. Mr. Proctor urges observers not to dismiss these as nuisances as the Frenchman Charles Messier did 200 years ago. He was seeking fame as a comet discoverer. He charted these "fixed" hazy objects so he would not be fooled into thinking they were comets. Today, his work in comets represents scant importance. But he has been immortalized by the letter M. This is prefixed before the number designating each of the nebulous appearing sights found by him and later astronomers.

M-13 in Hercules appears in binoculars as a roundish mist. An observatory telescope shows it as a ball of stars. It is the Great Cluster of Hercules and is spherically proportioned as are about a hundred others of these appropriately named Globular Clusters.

Mr. Proctor might want to take his star gazing group by it in a sightseeing rocketship. It would have to go at least as fast as a ray of light (11 million miles or 420 times around the earth in a second.) Even at this rate a century would go by before the rocketship could cross this "ball." Yet it is so filled with stars that those nearer the center are only



Above—Instructor Proctor with spotter light



Below—Jones Beach stargazers focusing in

hours from each other as light travels.

Focus on the star in the middle of Orion's sword and you may think there is a smudge on your glass. This "smudge" is so expansive it would take a ray of light more than three years to bridge it. This is the Great Nebula of Orion. If you went searching for it with your rocketship, you would go right through it without finding it. It is a cloud of incandescent gas, so diffuse that there are only a few molecules to the square mile. But because it is so far away (its light requires a thousand years to reach earth) the cloud blocks our view of any stars behind it.

Mr. Proctor does not want his star gazers to become provincial-minded, content to roam only within their own galaxy. He usually has a telescope pointed toward a window into the greater space beyond. What you see (detectable even with the naked eye) is a kind of wisp. The "wisp" consists of some 100 billion stars. It is our neighboring Andromeda Galaxy. It is about as big as our galaxy and similarly pancaked shaped with a bulging center. You could get to feel very much at home in the Andromeda Galaxy among its familiar appearing red, yellow, orange, blue and white stars; some of them red giants and pulsating, many whirling about one another and others gathered in the loosely organized open clusters or in the twisting globular clusters.

If you wanted to make the visit, you would have to be prepared for a long, lonely ride. Your rocketship, traveling as fast as light, would not pass a star every few score years as it would going through our galaxy. After pushing off from this galaxy's edge, at the speed of light, you would not encounter a star for nearly a million years.

Now that you have become a *voyageur celeste*, you will soon become restless. Visiting this one neighboring galaxy is about par with traveling only as far as the next county. The Milky Way and Andromeda Galaxies are part of a cluster of galaxies. Like the stars inside them, the galaxies cluster into groups of 20 to thousands of galaxies. There are a score of them in our Local Group. In perhaps 30 million years your rocketship would be able to get around to each of those in our group. But really, you would not have traveled far.

We know there are billions of galaxies, each with millions and hundreds of billions of stars. Beyond the penetration of our instruments we do not know how many more myriads of galaxies there are.

Everything in the universe is in motion. If you could be out there somewhere in the vast, silent space of our galaxy, and your eyes were able to compress light years into fractions of a second, you would behold an amazingly dynamic spectacle. Stars would whish by as though you were flagging vehicles on some celestial speedway. These would include the very stars that seem so "fixed" in our sky that navigators can rely on them for determining directions. Yet, the minute it takes to focus on the North Star, it probably has clipped off a few hundred miles in its orbit around the galaxy.

All the stars we see are speeding around the galaxy. Some are going faster than others. From your vantage point you might sight one average-sized star coming around at 150 miles a second, dragging its family of revolving planets. The little systems of inter-revolving stars will pass you. The big globular clusters will come rolling by as they rush around the center.

If you could get where you had a perspective on the whole universe, you probably would see a sight that was incomprehensible even as it was occuring before your eyes. For galaxies by the great fistfuls are thought to be spinning through space, pulling away from each other at millions of miles a second. This means our own Local Group is charging away from the other clusters of galaxies at some fantastic speed.

The farthest galaxies we have been able to observe appear to be moving away from us at 37 million miles a second. Yet our instruments are detecting them as they were two billion years ago. That is when the light reaching us now left those galaxies. Remember, light travels 11 million miles a second. Where they are today can only be known by some Jones Beach star gazers in another two billion years. But by that time, will the clusters have gone beyond our range of observation? Will our group of some 20 galaxies be speeding through space alone? This is the expanding universe.

On a chilly night at Jones Beach you look out over the white-fringed black space that is the ocean. You can imagine seeing stars low in the horizon moving slowly by. But the fact that you can perceive the motion recalls you to the reality that these are the lights of fishing boats. You think how the navigators for centuries have used the spinning, whirling, hurling suns to determine where their boats are located in the world. Even at that moment some sailor might be finding his way home by the light that left the North Star about the time Columbus was navigating the ocean.

You look up deep into the sky and you wonder if there will ever be a way of telling where you are in the universe and whither you are bound.

A New Day for Greenwood Lake

by Eli Dietsch, N. Y. S. Conservation Dept.

Richard W. Gross, N. J. Division of Fish and Game

Day's catch of browns, Greenwood Lake

Greenwood Lake, which we share with the State of New Jersey, long has been a mecca for cottagers, swimmers, boatmen and, until late years, fishermen. Here's what can be done (and was done at Greenwood) through research, management and sportsmen's co-operation to return good fishing to the recreation picture.—Editor

AN unusual, yet welcome, sight was observed on April 15, 1958 at Greenwood Lake—a famous summer resort on the New York-New Jersey state line. The unusual was the crowd of anglers observed who were fishing for trout, an almost unheard of thing in that lake. Reason for this unusual angling activity is the new three-year experimental trout stocking program being conducted by the New York State Conservation Department and the New Jersey Division of Fish and Game.

The three years of experimental work are now complete. The result has been the development of a very successful trout fishery and a shot in the arm to the economy of the Greenwood Lake region. In less than two years, Greenwood Lake has risen to what is considered by many, the finest trout fishing water and the greatest potential for big trout in southeastern New York and northeastern New Jersey. Boat liveries, which had not paid their way for years, suddenly did not have enough boats to satisfy the anglers. One hardware store owner said that the demand for fishing tackle was so great in 1958 that he put in a full window display in 1959.

Greenwood Lake is not a "typical" trout lake, although the stocking of large brown trout was mentioned as a possibility in the 1936 report by the New York Conservation Department's old Bureau of the Biological Survey. About 50 per cent of the lake's total area, 1,920 acres, is less than ten feet in depth. The other half of the lake is much deeper, dropping to a maximum of 57 feet.

More important is the absence in the late summer of a large volume of cool, well oxygenated water. The lake does stratify during the summer, forming three distinct thermal layers: An upper layer of warm water called the epilimnion; a middle layer of rapidly cooling water called the thermocline; and a deep layer of cold water called the hypolimnion. It is the thermocline with its cool, well oxygenized water that provides the trout with a summer home. Above the thermocline, water temperatures are too warm for trout and below the thermocline there is generally little or no oxygen for fish life.

These three layers are readily identified in the lake until late summer when the thermocline may be absent from the lake. With the near absence of the thermocline in late summer, temperatures become marginal although tolerable for trout above the 25-foot contour line where there is sufficient oxygen.

The two questions that naturally arise, then, is why were trout stocked in Greenwood Lake and why were they successful? The answer to these questions had their beginning in the mid-fifties when the "normal" complaints about poor fishing in Greenwood Lake began to increase to an unusual degree. Checks by New Jersey fisheries' personnel tended to indicate some basis for these complaints. First, the expected rise in the largemouth bass population, which seems to follow pickerel population peaks in New Jersey, was late in materializing. The pickerel catch, which has always been the backbone of the fishery here, continued at a very low level; only the larger sizes of yellow perch and sunfish were being taken. Medium-sized fish seemed almost non-existent. Chemical sampling of two coves in 1957 suggested that the 1955 and 1956 year classes of yellow perch and sunfish were nearly, possibly entirely, absent from the lake; the sampling also supported reports of the scarcity of catchable bass and pickerel.

In 1957, small largemouth bass (9 to 12 inches) were being taken more frequently. This was the only bright spot in the picture, but since largemouths are sought for by a comparatively small number of fishermen and taken by even fewer, a positive program toward improving the fishery here was considered both necessary and justified.

Coinciding with the Greenwood Lake investigations was the experimental study of a put- and delay-take trout fishery in Lake Hopatcong, New Jersey being carried out by biologists of that state. The results at Lake Hopatcong were so encouraging that such a project was also considered for Greenwood Lake whose environmental conditions are very similar.

The next step was a series of meetings between the New York State Conservation Department and the New Jersey Division of Fish and Game, and subsequently, with representatives of the Passaic County and Orange County sportsmen's federations. Following these meetings a joint program was designed. The two state agencies were to stock 3,000 adult trout, 1,000 each of rainbow, brook, and brown of which a certain per cent would be tagged. The program was to begin in April, 1958 and continue for three years. Under authority provided for border waters, special regulations were established for the trout fishery including no size limit, 3 trout per

Stocking from a live-car

person per day and an open season from April 15 to November 30.

The collection of the data was made the responsibility of the Greenwood Lake Trout Committee which was composed of sportsmen from both Orange County and Passaic County federations. The fine job done by these sportsmen was largely due to the efforts of William Acker of the Orange County Federation and Al. Bortolot of the Passaic County Federation. Pertinent information and tags collected by the Committee were turned over to either of the two state conservation agencies and processed by their biologists. The Committee also took charge of publicizing the program and awarded numerous prizes for the return of trout tags which could be turned in at any one of twenty check points established around the lake.

The total catch for 1958 was 1,325 trout which represents a 42.8 per cent. harvest of the trout stocked. In 1959, 1,167 trout planted in 1959 were caught for a 38.8 per cent harvest. In addition 290 trout from the 1958 stocking were also caught in 1959. In 1960 the stocking figure was increased 50 per cent. and 4,700 fish were released. Of this number, 1,765 or 37.6 per cent were caught in 1960. Also, 80 of the 1959 plant, and 55 from the 1958 plants were taken. This raised the efficiency of the harvest from the 1958 stocking to 1,670 fish or 54.0 per cent of the initial harvest. The total 1959 return amounted to 1,247 trout or 40.9 per cent of the original number.

To further evaluate the Greenwood trout program, a breakdown of weight harvested was essential. The very excellent initial harvest of the 1958 plant, 1,147 pounds or 67.8 per cent of the original weight, was supplemented each of the following two years. In 1959, 901 pounds were harvested which consisted of fish ranging from 2 to 7 pounds and 333 pounds of fish ranging 5 to 8 pounds, in 1960. The total weight harvest of 2,381 pounds or 141.1 per cent the original 1958 plants(by weight), is phenomenal for a stocking of catchable-sized fish. In 1959, 910 pounds or slightly over half the stocking was harvested. In 1960, 307 additional pounds were taken to give a total return of 1,217 pounds or 68.1 per cent of the plant. An excellent weight return of 1,402 pounds or 67.2 per cent of the original plant was recorded in 1960.

Biologically speaking, several factors contributed to the success of this experiment. The marginal trout conditions in Greenwood Lake proved sufficient to carry trout through the critical summer period. These holdover trout are important to the fishery for they are next year's surprises for the angler. A report of a big one now and then is sufficient to maintain the anglers' interest.

The lack of competition from yellow perch and pickerel may also have contributed to the high yield, exceptionally good growth and the large number of holdover trout. There is evidence from the Lake Hopatcong data that the greater the competition from yellow perch, pickerel or holdover trout, the poorer will be the subsequent harvest of other trout.

The lower initial harvest of brown trout in 1959 and subsequent poor holdover harvest of brown trout in 1960 from the 1959 plant, is probably due to the dominant 1958 year class. These phenomena occurred at Lake Hopatcong with brown trout, but not to the degree with which it occurred at Greenwood Lake in 1960. This pattern of holdover catch, if it follows Hopatcong's pattern, will consist of a large catch of medium sized (2 to 4 pounds) brown trout every other year. On alternate years, the holdover catch will consist mainly of large individuals (4 to 8 pounds).

Studies by the New Jersey Division of Fish and Game revealed that the primary link in maintaining a trout fishery in a lake of this type involved the presence of suitable food or forage which would occupy the same area of the lake as the trout. The landlocked alewife or "saw belly" with its characteristic of open water feeding and occupying the thermocline-lower epilimnion of the lake, satisfied this requirement. The trout feed almost exclusively on this little forage fish from May to November and occasionally in the winter.

The growth of the stocked trout in Greenwood Lake was excellent. Brown trout that were in the lake an average of twelve months showed a growth increment of over 7 inches for the period. One fish grew 11 inches and gained 6 pounds 2 ounces in thirteen months. The result of this excellent growth was a catch of many 5- and 6-pound trout during 1959.

The size of the trout stocked is an important factor for it was demonstrated early in the Lake Hopatcong studies that the size of the fish influenced the harvest. Trout 10 to 12 inches in length were found to give the best return and were recommended for stocking in Greenwood Lake. Additional data from the Greenwood Lake study, however, demonstrated that brook trout 8 to 10 inches in length gave nearly the same returns as brook trout 10 to 12 inches in length. Therefore, it became obviously unnecessary from an economical standpoint to stock 10 to 12-inch brook trout which are much more expensive to raise.

The data, on the other hand, confirmed the necessity of stocking 10 to 12-inch brown and rainbow trout in order to favorably compete with the abundant warm water fish population. They also feed extensively on the landlocked herring and must be of sufficient size to utilize this food resource.

Important also was the utilization of the combination of the three species of trout with their slightly different habits and reactions to conditions. Well defined peaks of catchability occur at different times during the season for each of the three species. The brook trout are taken early, followed by the rainbows in late April and May and again in the late fall, with a similar peak for browns during late May and June. The net result is an elongation of the period for successful trout fishing.

An additional dividend from the experimental program has been the investigation of the various types of tags and tagging techniques. Comparisons were also made in certain characteristics of various hatchery stocks of trout.

What the future will bring is always difficult to predict. However, success over the first three seasons appears to amply justify continued management to maintain a trout fishery in Greenwood Lake.

Table 1. Catch of Trout, Greenwood Lake, 1958-1960

	No.	*1958*		*1959*		*1960*		*Total*	
Year	*Stocked*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*
1958	3,093	1,325	42.8	290	9.4	55	1.8	1,670	54.0
1959	3,050	—	—	1,167	38.3	80	2.6	1,247	40.9
1960	4,700	—	—	—	—	1,765	37.6	1,765	37.6

Table 2. Weight of Trout Harvested, Greenwood Lake, 1958-1960

	Lbs.	*1958*		*1959*		*1960*		*Total*	
Year	*Stocked*	*Lbs.*	*Pct.*	*Lbs.*	*Pct.*	*Lbs.*	*Pct.*	*Lbs.*	*Pct.*
1958	1,691	1,147	67.8	901	53.3	333	20.0	2,381	141.1
1959	1,787	—	—	910	50.9	307	17.2	1,217	68.1
1960	2,085	—	—	—	—	1,402	67.2	1,402	67.2

Left—A serene pool at the George Landis Arboretum

Hickory pine (Pinus aristata) *said to be the oldest living plant species on this earth*

Wildlife and an Arboretum

ANY change in the cultivation or planting of a section of countryside is bound to influence and to be influenced by the wildlife of the section. The land upon which the George Landis Arboretum is laid out, upon the hills above Esperance in Schoharie County, is no exception. Cleaned originally for farming, the land offered only minor shelter for birds and animals, but as the Arboretum trees developed into a young forest and shrubs transformed hillsides into thickets, wildlife has been quick to take advantage of the added shelter and food. Some of the inroads have been a pleasure; some have presented perplexing problems.

Although the main planting of the Arboretum was not made until 1951, the barren knolls had been reforested with State nursery seedlings in the mid-thirties. These plantings are now well grown and fruiting trees. They have made excellent shelter belts for the protection of tender exotics, particularly for the section of rhododendron and azaleas planted under them. They have also brought a most pleasurable addition to the flocks of winter seed-eating birds like the pine grosbeaks, which I used to see here only rarely. They also furnish stopping places for some of the migrating warblers in the spring and increasing nesting sites for birds like mourning doves, blue jays and crows.

The shrubs that bear berries and the individual trees that bear conspicuous fruit, like the mountain ash, have attracted an increasing number of migrating birds or wandering bird flocks in the fall. And here is where pleasure begins to mingle with perplexity. To a botanist or to a gardener, a viburnum covered with berries is more interesting than a bare bush with a couple of birds. I have, therefore, been exasperated to see in mid-October a flock of robins or waxwings descend upon a firethorn bush covered with bright orange berries and leave it a few hours later an inconspicuous green shrub. But this habit is even more devastating to the seed collector. One of the services that an arboretum likes to offer is seed exchange. Many seeds, if they are to germinate, must not be picked until they are ripe. Birds are usually not so particular. Many seeds they eat green and at these I rarely get a chance. Others they too like to have ripened and they seem to keep as careful a watch as I. Last fall, for instance, I had been waiting to collect some seed from a heavily loaded bush of autumn elaeagnus. I had been watching it daily, but both the birds and I made up our minds on the same day. Unfortunately, I waited until noon; the birds decided in the early morning. When I arrived, not a berry was left on the bush and not more than half a dozen on the ground beneath it.

Among the increasing animals come first of all those that find both food and shelter for year around living. This would include squirrels, chipmunks and rabbits. Squirrels overrun the conifer sections. They chatter at one from the trees, collect the cones, sometimes store them in the rebuilt stonewalls, sometimes in open piles among the rhododendron and azaleas, sometimes buried singly in little holes among the pine needles. In general, they do little damage except to circumvent seed collecting, as the birds do with the berries on the shrubs. Chipmunks can be more of a nuisance. They particularly like to live in the stonewalls that form north shelters for the spring bulb gardens, and crocus and tulip bulbs are their favorite foods. This section I have to keep clear of them. If I have time, I do it by catching them in weak spring traps which do them little injury and then releasing them in a somewhat distant wood lot. If I am too busy I resort to a .22, although I dislike to do it. But they can ruin a whole planting of established bulbs in one spring or fall. Out in the Arboretum they make the naturalization of crocus and tulips almost impossible. Fortunately they dislike all of the narcissus family and the naturalization of these develops undisturbed.

Umbrella pine

Occasionally, I find in the rhododendron section a young plant that has just been set out and a day or two later dug up by either a squirrel or chipmunk. Neither the roots nor the plant seem to be eaten; it is just dug up and, unless I find it in time, left to die. I

A Contest With Nature

by Fred Lape

don't know the reason for the digging. Perhaps the animal expected to find a new and succulent mouthful and, not liking what he found, left it, as a rabbit bites off a choice azalea branch with bud and then leaves it untouched on the ground. Or perhaps it was curiosity.

There is another group of animals which, not having their main shelters in the Arboretum, still find it a pleasant grazing spot. Rabbits again are in this group, but more particularly deer.

There is one bit of rabbit psychology that always puzzles me. In mid-winter a rabbit will come out of his hole on a hillside covered with red maple saplings and raspberry and blackberry bushes, all of which he likes, and run a good quarter of a mile over the snow to eat the same food in my backyard or in the Arboretum. I know this, for in destructive periods I have tracked them to their holes. Many a rabbit here has lost his life for that dogged determination to graze far afield. However, rabbits, like humans, relish new and strange tastes. Many of the exotic shrubs and trees are delicacies to them—the cotoneasters, the brooms, the firethorns, some of the viburnums, the oriental crabapples. Every young plant at the Arboretum has to be covered year around with wire beyond the reach of a rabbit. Fortunately, I find they dislike certain families of plants—buckthorn, euonymus, most of the honeysuckles, holly, the Japanese cherries. But I would not trust them in bad winters, when pressed for food, to resort to any of these, for I have seen them at such a time eat even young blue spruce, certainly a harsh diet.

Deer, however, are the big and increasing problem. A good share of the winter and part of the summer they roam the Arboretum nightly. Nothing is wholly safe from them. They will graze off a low branch of a Japanese flowering cherry or of an oriental flowering crabapple just coming into flower in the spring or nip off the top shoot of a rare young Asiatic maple just head high. They are most destructive to certain of the evergreens. One hard winter, in the early years of the Arboretum, they stripped the leaves and buds from practically the whole rhododendron section. Of the needled evergreens, they like particularly the yews and, if they are making a straight line through a section, seem to be able to smell even a little one yards off their track and if it is not protected they will graze it to nothing but a stub. All the arborvitaes are also in danger; that, incidentally, is one of the reasons why plantings of white cedar, the American arborvitae, have not been very successful in this section; they are too frequently grazed over when young by deer.

Deer rarely bother the pines, the spruces and the firs, although on severe winters I have seen young white pines grazed over and often I find nipped off the succulent center shoot of young heavy twigged spruce and fir like *Picea nordmanniana* or *Abies concolor*. One of the most beautiful evergreens in the arboretum, a weeping Nootka cedar (*Chamaecyparis nootkalensis pendula*) from the Puget Sound region, they have been particularly determined to eat, and even one year went to the extent of pushing partly over by brute strength the posts holding the wire fence around the tree and so grazing off the uphill side, a pruning from which the specimen will never quite recover. Some other exotics, such as the Japanese umbrella pine (*Sciadopitys verticillata*), they do not bother.

Bucks in the fall like to rub off their antler velvet on any dense young evergreen and several of our young oriental evergreens have been ruined in this way. Unfortunately, the better looking and denser the specimen, the more apt a buck is to choose it.

Of course, the deer problem is not limited to arboretums. Orchards also suffer. Here the open season has not kept sufficient check on the herds. We, unfortunately, are located just at the edge of Schoharie County, adjoining Montgomery which is closed to deer hunting. As soon as the first shot of the season is fired, the deer retreat to the haven of Montgomery County and stay until the season is over, then come back here for the winter. So far we have found no protection against them except to put a circle of sheep fence or for a small specimen a circle of chicken wire, around each vulnerable tree or shrub in the Arboretum during the early fall and winter. Wire must also be put across the top of small specimens, for deer are very adept at sticking their muzzles down inside a circle of wire and eating everything that is there. This means a great deal of work, but the cost of a deer-proof fence around the whole Arboretum would be tremendous and, it is doubtful, whether in this hilly and windswept section a deer fence would be fool-proof against the deep drifts of a heavy snow winter.

Some experimenting has been done in the use of sprays to protect small trees and shrubs against rabbits, but nothing really effective, as far as I know, has been developed as protection against deer. It is, of course, a much newer problem than the rabbit problem and the development of a satisfactory spray might be more difficult, since evergreens, the common winter fodder of deer, are rather vulnerable to oil base sprays.

So much for the problems of animals and birds in an arboretum. There is one other change that an arboretum is bound to make on a section of countryside and that is the seedlings it will throw off; seedlings which may eventually find themselves at home, become natives, and spread. Of the exotics introduced here, the most rampant so far are the Asiatic honeysuckles. I find hundreds of seedlings of these throughout the Arboretum each spring and they will undoubtedly in time become as widespread and as common in this section as chokecherry. Seedlings from the Asiatic crabapples seem to have good stamina and will probably spread, although they will in their growth be attacked by more enemies than the honeysuckles. It will be curious to see in time if they will interbreed and intermingle with the thickets of wild apples now flourishing on deserted land in this section. I also find seedling of the buckthorns (*Rhamnus*) and they will eventually become native to this section as they have already along the lower east side of the Hudson, where they escaped originally from estate gardens. Some of the small tree forms euonymus, like *europaeus* or *yedoensis*, have already seedlings growing beneath them, but they will probably spread more slowly, since birds do not seem to care much for the fruit.

The spread of the evergreens is questionable. I have often wondered why conifers like the Norway spruce and the blue spruce, that seem to flourish and fruit well in the Northeast, do not seed themselves. Here at the Arboretum I find that the introduced pines, although they fruit regularly, rarely start seedlings. Squirrels may get most of the seeds, but they must get most of the native white pine seeds too, yet young white pine seedlings spring up around old fruiting trees like weeds. The Japanese white pine is perfectly hardy here and fruits vigorously, but I have yet to find a single seedling growing.

Working with an arboretum is a never-ending contest with Nature; frequently a gamble, with wildlife on hand to stack the cards. But the game is well worth playing.

Note: The George Landis Arboretum, located just north of Route 20, near the Village of Esperance, is open to the public at all times without charge.

The Cycle of Life

In a Small Fresh-Water Pond

by Dirck Benson, Supervising Wildlife Biologist

WHAT makes a pond what it is? Why does it tick and what keeps it ticking? Some mighty tomes and numerous technical articles have discoursed on these factors, but here we hope to show you what happens in a pond as a duck might see it, or perhaps a fish, an otter, or such a minute aquatic creature as a rotifer.

As biologists and sportsmen, we may cater to the more showy end products—pan and game fish and waterfowl. But it is the elemental and microscopic activities that really make a pond what it is. Wayne Trimm's centerspread illustrates in brief the factors that are involved. Here we will try to show in words some of those factors entering into the life and times of a pond.

A pond is a complex living unit, a community where the welfare of each inhabitant is dependent on all the others. Just as in the human system, little changes make mighty differences—little headaches, unhappy innards and aching joints may forebode more dire problems. And in the pond some little change may break the cycle, destroy some animal colonies and result in a change of flora and fauna and, finally, in the entire character of the pond.

To make a pond there must first be a basin to collect and hold the water and its location predetermines some of the pond's character. Waters draining over granitic rocks, for instance, bring in very different proportions of the chemical elements than those seeping through limestone soils. Also, the topography of the land affects the shape of the basin, and, in turn, its area, depth and bottom conformation. Likewise, the size of the drainage area influences the water inflow, rate of water turnover, flushing and siltation. Latitude, longitude and altitude affect climate and thus, precipitation, wind, rate of heating or cooling and the dates and duration of the growing season. Each of these factors bears on all the others so that the final productivity of a pond reflects the use that all its organisms can make of the bottom deposits and substances in the water, aided by the sun's energy and as modified by light penetration, heat and water stratification and available oxygen. No wonder that one can find no two ponds alike and that the same kinds of fish and ducks don't thrive equally well in every pond.

Now comes man, as if the rotifer's environment wasn't already complicated enough! Through such human activities as agriculture, mining, industry and domestic waste disposal come more additions to our ponds—faster silt deposition, agricultural fertilizers, nutrient rich sewage and sometimes chemical poisons. Every addition results in changes in the plant and animal life of the pond—sometimes immediate and obvious; sometimes slow and imperceptable, until we suddenly realize that it isn't that the fish aren't biting, simply that the fish aren't. This pond is a new environment from the one we used to fish.

But these are only the outside factors; the ones we can readily see. What actually happens within the inner "wheels" or mechanism of the pond?

In general, we know that water contains various non-living substances, both organic and inorganic. Plants, both free-floating and rooted, visible and microscopic (with the aid of the sun), convert these substances into living tissue—thus, plants are the basic producers in a pond. Then come those animals that feed on plant material and change it to animal tissue. These are the primary consumers. Next are the animals that eat the animals that eat the plants. These are the carnivores—the secondary consumers. Atop all this are the tertiary or third in line consumers, and on to the *nth* power—as little critters prey on bigger critters right up the line past the duck and the bass, perhaps to the otter or mink.

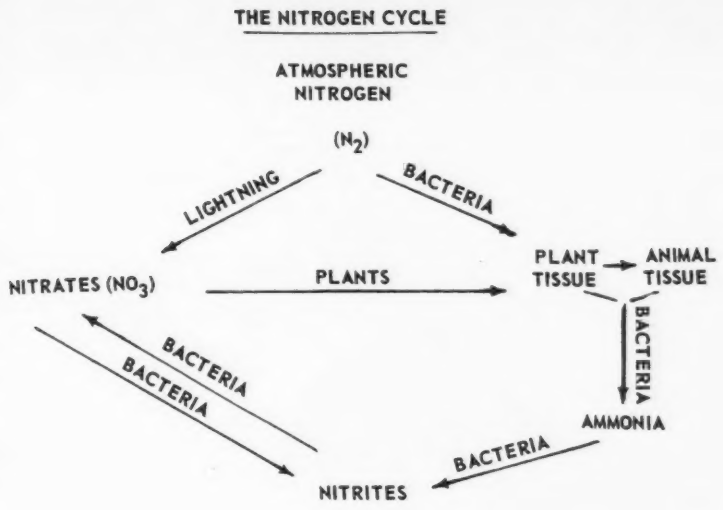
Sounds all very simple, logical and uncomplicated—just as we, one of the top-dog land carnivores, follow the steps from grass to cow to rare beefsteak on the platter. But again, so like man, we have overlooked one important item—the proper disposal of waste products. Some plants live and die without being eaten. So do some animals. All plants and animals produce waste products. Along with this, some carnivores are fastidious eaters and do not consume all parts of their prey. Others are just not neat eaters or, over-sated, drop or leave behind protein morsels. All these items, plant and animal parts, and waste products, tend to settle to the pond bottom temporarily out of circulation.

Fortunately for all denizens of marsh and pond, man included, the next link in the chain is seldom broken, 'though, a curse on man's blindness, it is often stretched near its limits by pollution. This is the reducer link—the bacteria and fungi which break down the proteins and other organic structures into forms where they can again be used as nutrients. So thus we have seen our way around the circle — essential elements taken from the environment, incorporated into protoplasm and reduced again to available nutrients in the environment. Some call it the nitrogen cycle.

An essential key to understanding what takes place in a pond is knowledge of the properties of water. *Water is a solvent*—the total dissolved solids in a fresh-water pond may vary from 50 parts per million in that draining from silicious (silica-laden) soils to 300 parts per million in calcareous (rich in calcium) regions. The average, however, is 150 to 175 parts per million with sodium, magnesium, potassium and calcium salts being important constituents. *Water is a suspender of solids*—both organic and inorganic materials. This is important in two ways, for clays and other substances in suspension affect color and light penetration and, silt and rubble are transported and then dropped in still waters. *Water is an absorber of gases*—so oxygen, carbon dioxide and nitrogen are available for the pond's plant producers to use for synthesis (manufacture) of protoplasm. Probably more gases are brought to the water through rain than by direct absorption at the surface, but more important still to the community is the free interchange of gases between plants and animals, as the plants take in CO_2 and gives off O_2 and the animals reverse the procedure.

The oxygen-carbon dioxide relationship in a pond is vital, effecting many aspects of the environment. During the day the oxygen content near the surface is high from plant activity and this in turn tends to change the simple carbonates to bicarbonates freeing calcium to make the water more alkaline. At night, tiny crustaceans and other animals that during the day have been lying low, move toward the surface to feed, giving off carbon dioxide and using up the oxygen, returning the waters to more acid conditions again. And this, by the by, is a reason why evening fishing may be better than at mid-day. The big ones are out after the littler ones that are busy converting the plant material to meat.

In the lower depths where little light penetrates and plants don't thrive (this



depth varies with the water color and material in suspension) there may be little or no oxygen. Under these conditions decomposition of waste products by bacteria, those kinds which live in the absence of oxygen, is slow. Old trees lying on Adirondack pond bottoms may last 100 years. But decomposition does gradually take place and the products are the so-called marsh gases—mostly methane and hydrogen sulfide which are of little value to our pond.

Back nearer the surface and in shallow waters where plant growth and wind action keep the oxygen supply up and well distributed, aerobic bacteria, the kinds that thrive in the presence of oxygen, busy themselves with their nitrification chores. That is to say they are breaking down complex plant and animal materials into ammonia, nitrates and simple nitrates which can serve again as plant nutrients. So there it is again—that nitrogen cycle.

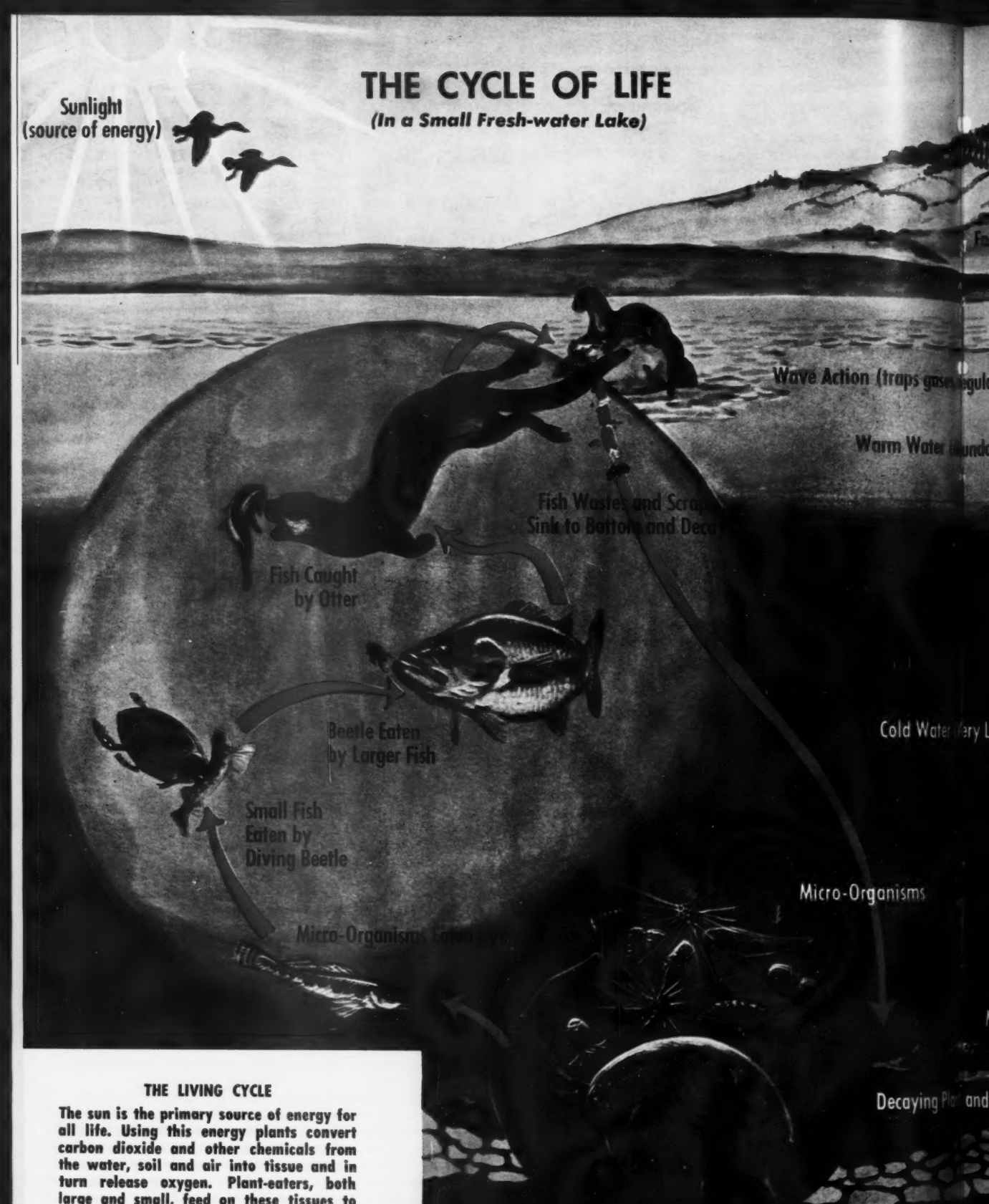
The other important bio-chemical cycle is that involving the carbonates and lime. Calcium is essential to plant nutrition and plays a big part in controlling water acidity through its reactions with carbon dioxide and other compounds. Calcium forms the skeletons of many animals, such as snails. Calcium helps create the proper environment for the microorganisms which in turn release nutrients; it aids in release of phosphorous fixed as insoluble iron and aluminum compounds under acid conditions and it decreases the release of toxic substances elaborated by bacteria under acid conditions. The availability of calcium, provided it is present, varies with the acidity of the water—rising with an increase of oxygen and falling with an increase of carbon dioxide. In many Adirondack ponds there is too little lime, but the white marl ponds, formed of accumulated deposits of calcium carbonates from animal shells and precipitation, may be too alkaline for most plants.

But that is just about enough about the chemistry of our pond—suffice to say that the changes are complicated beyond the basic carbonate and nitrogen cycles. Other chemicals are involved such as sulphates, phosphates and chlorides tied up with sodium, potassium, calcium, magnesium, iron and aluminum. We are a long way from understanding all the chemical reactions that take place and affect life for there are at least 16 elements that are essential in greater or lesser amounts to most plant life. Plants in general thrive best in slightly limy or alkaline waters but a few plants are best adapted to boggy, acid waters. Iron, common salt and sulphur in abundance make marked differences in the pond's flora and fauna. Available iron is essential to plant growth—too little iron and some aquatics don't grow; too much and it may be lethal. In acid waters iron is prone to be too available; in alkaline waters it is precipitated out as insoluble salts.

One last but very important point about water and ponds. As water cools it becomes denser and heavier and the cool water, following the law of gravity, sinks toward the bottom and becomes layered. Surface water heated by the sun and stirred by wind, current and other action will mix and circulate, but below a certain point the mass of water remains nearly still. This line of division is called the thermocline. Below this line, with less light penetration and few plants, the supply of oxygen is depleted as the summer advances for there is little or no replacement. Depletion is rapid in ponds with accumulated dead plant material, but in ponds with less dead plant material adequate oxygen for fish may persist all summer. The depth of the thermocline varies with the pond's depth, shape and exposure to the elements.

Twice a year this stability in the lower layer is broken. In the spring when the ice and snow melt, the surface waters become cooler than the water on the pond bottom. Aided by the wind, this condition provides almost a complete turnover of the water. This churning stirs the bottom water and brings back to the surface many nutrients that were temporarily lost. Further, it brings a circulation of oxygen through the whole pond. Again in the fall the surface water is cooled and, when it reaches a point cooler than the bottom waters, there is again a turn over. When the pond is "working," nutrients and oxygen are dispersed. Fish distribution to all depths is most general at this time. Most characteristic are the algae "blooms" that thrive on the suddenly easily available nutrients near the surface.

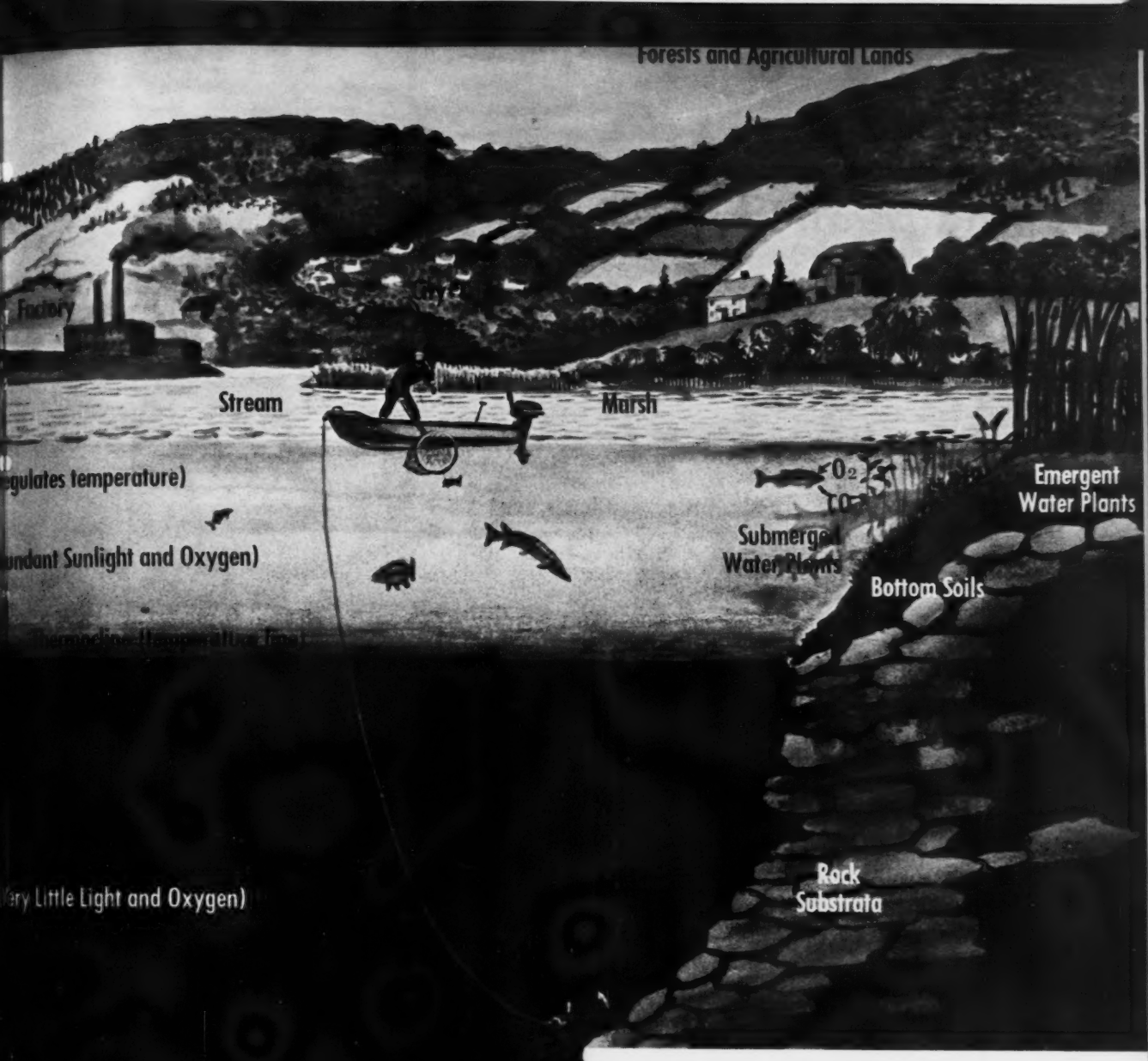
So that is the story of the pond. There was a basin. It rained and water collected. The water was carrying chemicals from the drainage. The sun shone. Algae, such as the desmids, diatoms and blue-greens near the surface, and rooted plants, such as the pond weeds on the bottom, used the sunlight to manufacture plant protoplasm from the chemicals. Along came amoeba and other protozoans, some rotifers, clams and snails, many crustaceans, some insects and other forms of life, and, some nibbled and some gorged on these plants. While they were busy eating and digesting, other protozoans, rotifers, molluscs, many crustaceans, insects and other forms of life came and nibbled and gorged on the plant eaters. About this time some of the aquatic vertebrates entered the picture—frogs, salamanders, tadpoles and many kinds of minnows. Some ate salad, others steak and the successful prospered. Along came Mr. Bass. When he was little, he ate little steaks. As he got bigger, he ate big steaks. He was alert. He dodged the otter and mink and he ignored the juicy (on the hook) worm and the beautiful spinning lure. He reproduced and died peacefully in late winter of old age and deficient oxygen. He eventually sank to the bottom after smaller organisms had chewed on him. The bacteria digested his remaining parts and he was back in circulation again as nutrients in an outdoor, balanced aquarium.



THE LIVING CYCLE

The sun is the primary source of energy for all life. Using this energy plants convert carbon dioxide and other chemicals from the water, soil and air into tissue and in turn release oxygen. Plant-eaters, both large and small, feed on these tissues to

(Continued on page 38)



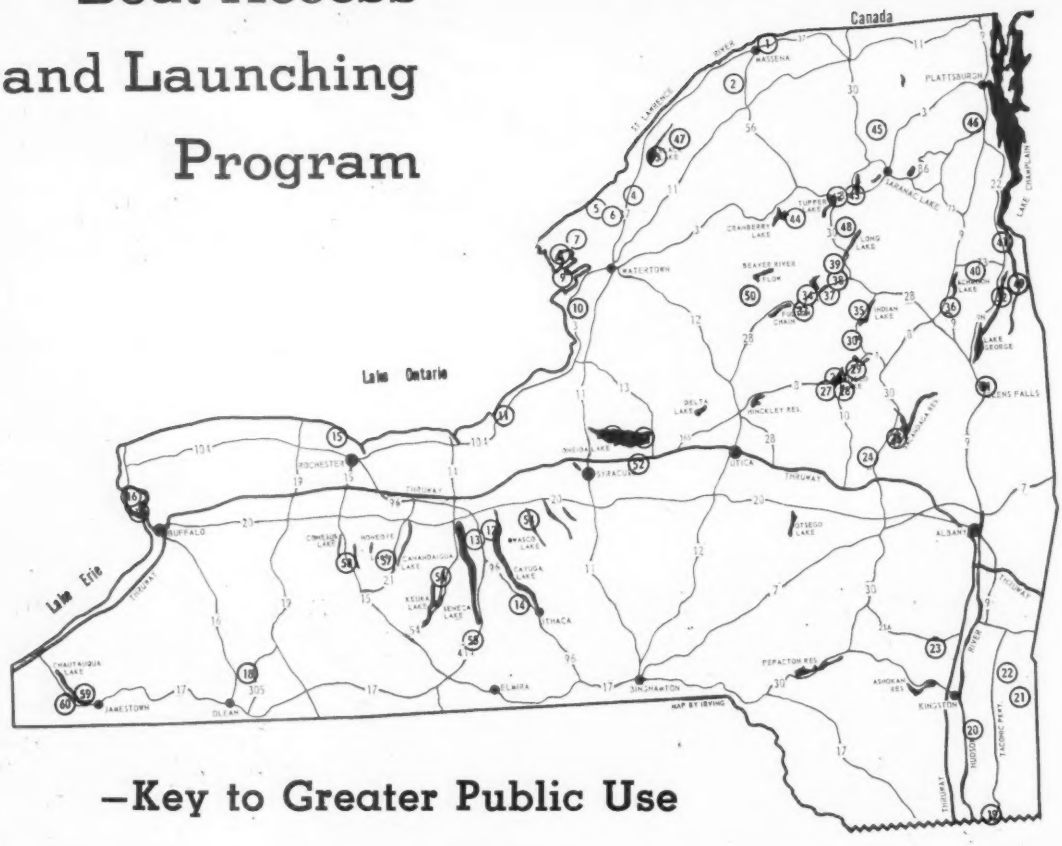
THE WATERSHED

Water, entering the pond basin, brings chemicals from the soil and material from the surface such as the wastes and losses from agriculture, mining, industry and domestic sewerage. Chemical compounds entering the pond vary with those available and their degree of solubility. Sometimes the amounts are ideal for plant growth but not always. There are at least 16 elements that are known to be essential to plant growth:

***Needed in large amounts*—carbon (C), oxygen (O_2), hydrogen (H), potassium (K), phosphorous (P), sulphur (S), magnesium (Mg), nitrogen (N), calcium (Ca).**
(Cu), molybdenum (mo).

(*Continued on page* 38)

New York's Boat Access and Launching Program



—Key to Greater Public Use of Our Waterways

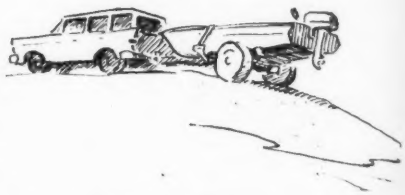
EVERYONE—even the builders of boats, trailers and outboard motors—has been hard-pressed in recent years to keep up with the boating boom—the discovery by new thousands of people each year of the fun to be had afloat on New York's thousands of miles of waterways.

It hasn't all been clear sailing, by any means. For the Conservation Department, as for the boating public, the problem has been not lack of navigable waters—with which we are blessed—but how to get to them and on them. Access to our lakes, rivers and marine waters are at a premium. Once there, facilities are needed for parking, launching and mooring—all in short supply and wholly inadequate to meet the demand.

For years, the Department's Division of Fish and Game, operating with such limited license funds as could be spared for the purpose, had acquired some access rights and constructed a few launching sites on the more heavily-fished waters of the State, but it was not until the newly-created Division of Motor Boats entered upon the scene and, more particularly, the passage of the $75 million recreation bond issue, that means were provided to develop a program to really meet the needs.

That program is now under way and is beginning to show real progress, as the chart on these pages will indicate. The goal: 300 public boat-launching sites on navigable waters all across the State.

When these facilities are complete—whether you travel deep into the Adirondacks on a boating vacation or whether you head for a spot on Long Island, the Great Lakes, the Hudson or St. Lawrence rivers—you'll find a boat-launching site not too far away.



MAP LEGEND

State Parks Launching Sites

1. **Barnhart Island**—In St. Lawrence State Park just north of Massena. Bituminous macadam ramp.
2. **Coles Creek**—On St. Lawrence River just west of Massena. Part of St. Lawrence State Park. Bituminous macadam ramp.
3. **Jacques Cartier**—Two miles south of Morristown. River Road. Flat rock ramp.
4. **Kring Point**—At Redwood, 10 miles northeast of Alexandria Bay. Bituminous macadam ramp.

5. **Wellesley Island**—At Fineview, four miles north of Thousand Island Bridge. Bituminous macadam ramp.
6. **Grass Point**—At Alexandria Bay, one mile east of Fisher's Landing. Route 12. Bituminous macadam ramp.
7. **Cedar Point**—Six miles west of Clayton. Route 12-E. Bituminous macadam ramp.
8. **Burnham Point**—Three miles east of Cape Vincent. Route 12-E. Bituminous macadam ramp.
9. **Long Point**—Fourteen miles from Three Mile Bay. Gravel ramp.
10. **Westcott Beach**—Four miles south of Sackett's Harbor. Permit required. Available from park superintendent.
11. **Fair Haven Beach**—Two miles north of Fair Haven. Route 104-A.
12. **Cayuga Lake**—Three miles east of Seneca Falls. Route 89.
13. **Seneca Lake**—At Geneva. Routes 5, 20 and 96-A. Ramp operated by concession.
14. **Taughannock Falls**—Eight miles north of Ithaca. Route 96.
15. **Braddock Bay**—Ten miles west of Rochester. Lake Ontario State Parkway. Concrete ramp and gantry for large boats.
16. **Big Six Mile Creek Boat Basin**—Western shore of Grand Island. Wooden ramp.
17. **Beaver Island**—Grand Island, nine miles north of Buffalo. Route 324 to S. Parkway. Gravel ramp.
18. **Cuba Reservation**—Two miles north of Cuba on Route 305. Two ramp areas.
19. **Clarence Fahnstock***—Nine miles east of Cold Spring. Route 301. Permit required. Available from park superintendent.
20. **Margaret Lewis Norrie**—Staatsburg, nine miles north of Poughkeepsie, Route 9. Ramp operated by concession.
21. **Rudd Pond***—Two miles north of Millerton. Route 22. Permit required. Available from park superintendent.
22. **Lake Taghkanic*** — Eleven miles south of Hudson. Route 82. Permit required. Available from park superintendent.

Public Campsites Launching Sites

23. **North Lake**—North Lake (undeveloped)* Near Route 23A. Three miles northeast of Haines Falls.
24. **Caroga Lake**—Caroga Lake (undeveloped). Route 29A. Nine miles north of Gloversville.
25. **Northampton Beach** — Sacandaga Reservoir. Near Route 30. One and one-half miles south of Sacandaga Park.
26. **Point Comfort**—Piseco Lake. (undeveloped). Access via Route 8. Four miles west of Speculator.
27. **Little Sand Point**—Piseco Lake. Access via Route 8. Three miles west of Speculator.
28. **Poplar Point**—Piseco Lake. Access via Route 8. Two miles west of Speculator.
29. **Moffit Beach**—Sacandaga Lake. Near Route 8. Four miles west of Speculator.
30. **Lewey Lake**—Indian Lake. Fourteen miles west of Speculator.
31. **Lake George Beach**—Lake George. Route 9 at head of lake.
32. **Rogers Rock**—Lake George (undeveloped) Route 9N. Three miles north of Hague.
33. **Eighth Lake**—Eighth Lake. Route 28. Five miles west of Raquette Lake.
34. **Brown Tract Ponds***—Lower Brown Tract Pond. Access via Route 28.
35. **Lake Durant**—Lake Durant (undeveloped). Route 28. Two miles east of Blue Mountain Lake.
36. **Eagle Point**—Schroon Lake. Route 9. Two miles north of Pottersville.
37. **Golden Beach** — Raquette Lake. Route 28. Three miles east of Raquette Lake.
38. **Forked Lake**—Forked Lake. Route 10. West of Deerland.
39. **Lake Eaton**—Lake Eaton (undeveloped). Route 10. Two miles west of Long Lake.
40. **Paradox Lake**—Paradox Lake. Route 73. Two miles east of Severance.
41. **Crown Point** — Lake Champlain. Route 8. Nine miles north of Crown Point.
42. **Rollins Pond**—Rollins Pond. Route 30. Twelve miles east of Tupper Lake.
43. **Fish Creek Ponds**—Fish Creek Pond. Route 30. Twelve miles east of Tupper Lake.
44. **Cranberry Lake**—Cranberry Lake. Near Route 3. Three miles south of Cranberry Lake.
45. **Meacham Lake** — Meacham Lake. Route 10. Nineteen miles north of Lake Clear Junction.
46. **Macomb Reservation**—Davis Lake* Three miles west of Route 22B at Schuyler Falls.
47. **Eel Weir**—Oswegatchie River at Black Lake Outlet. (undeveloped) Near Route 87. Six miles south of Ogdensburg.

**The use of mechanically-propelled vessels is prohibited on Davis Lake in Clinton County, North Lake in Greene County, and Upper Brown Tract and Lower Brown Tract in Hamilton County. Use of motor boats is also prohibited in Clarence Fahnstock State Park, Lake Taghkanic State Park and Rudd Pond. Launching located at these parks and campsites are for rowboats, canoes and other vessels not mechanically-propelled.*

Bureau of Fish Launching Sites

48. **Tupper Lake**—At Moody. Beach launching in launching basin. Parking for 45 cars and trailers.
49. **Fort Ticonderoga**—At Lake Champlain. Soil-cement launching ramp. Parking for 80 cars and trailers, 300 feet docking space.
50. **Stillwater Reservoir**—Beaver River Flow. Twenty-eight miles east of Lowville at Village of Stillwater. Gravel ramp. Parking for 30 cars and trailers.
51. **Godfrey's Point**—On Oneida Lake. Just off Route 49 between Cleveland and Jewell on north shore. Two plank ramps and log docking. Parking for 35 cars and trailers.
52. **South Shore**—On Oneida Lake. Just off Route 31 about one mile east of Bridgeport on south shore. Two plank ramps and log docking. Parking for 35 cars and trailers.
53. **Three Mile Bay**—On Oneida Lake. End of town road leading from Route 49 on Three Mile Game Management Area bordering north shore. Beach launching. Parking is available for 30 cars and trailers.
54. **Owasco Lake**—At Auburn on outlet of lake in Emerson County park. Soil-cement ramp and dock. Parking for 30 cars and trailers.
55. **Seneca Lake**—At Watkins Glen. Beach launching. Parking for 35 cars and trailers.
56. **Keuka Lake**—Outlet of Keuka Lake in Village of Penn Yan. Beach launching and dock. Parking for 30 cars and trailers.
57. **Honeoye Lake**—East shore of the lake about four miles south of Route 20A. Concrete ramp. Parking for 30 cars and trailers.
58. **Conesus Lake**—Southeast shore. Soil-cement launching ramp. Parking for 80 cars and trailers.
59. **Bemus Point** — East shore of Chautauqua Lake in Village of Bemus Point. Concrete ramp and dock. Parking limited.
60. **Prendergast Point**—West shore of Chautauqua Lake in Village of Chautauqua. Beach launching. Parking for 40 cars and trailers.

Mountains of the — A Guide

by Daniel Smiley

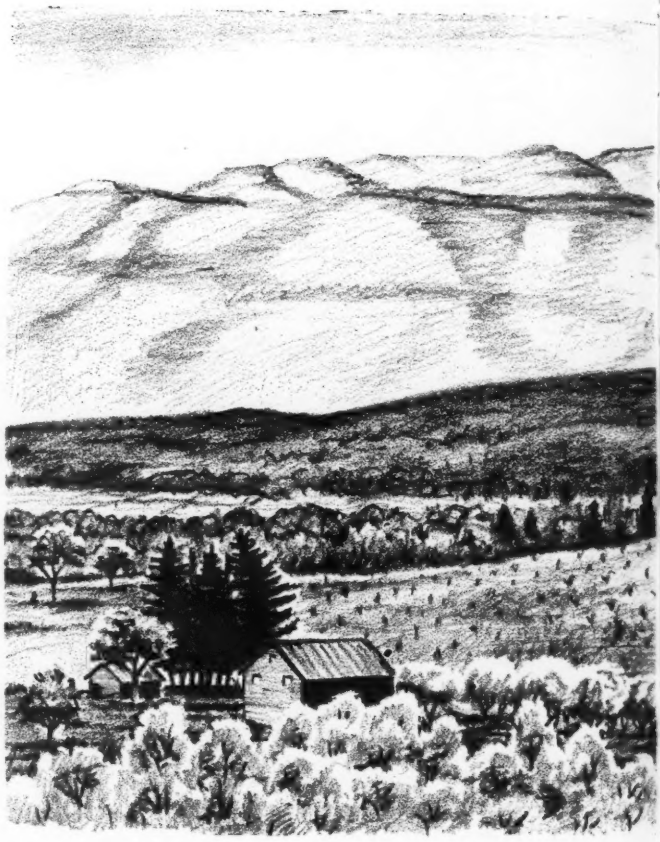
THE majesty and general interest to outdoor people of the "Kaaterskill" Mountains would be sufficient reason to compile this list of higher peaks. Actually, the stimulus came from the need of Fred Hough and the writer to know where to look for balsam fir. In the central Catskills these trees are generally found above 3,500 feet, so this became the lower limit for the list. Our interest in this species is not primarily botanical but stems from the apparent correlation of the distribution of the Bicknell's thrush with the balsam. The proving or disproving of this relationship is one of the long range projects of the Records Committee of the John Burroughs Natural History Society.

It was surprising to find that there are more than 30 mountains in the Catskill area reaching above this elevation. The basis and part of the inspiration for the list was found in H. A. Haring's "Our Catskill Mountains," (copyright 1931), pages 256 and 257. This had been compiled from the then available United States Geodetic Survey Maps, mostly of the 1904 edition.

When these were compared with the elevations given in "Catskill Trails" of the New York State Conservation Department and the latest available United States Geological Survey Maps, various discrepancies appeared in both names and figures. Letters addressed to half a dozen agencies, organizations and individuals produced some helpful information, but no complete up-to-date list was located. There was interest expressed in having such a list.

Thus, the following was compiled by reference to the latest United States Geological Survey topographic sheets made by photogrammetric methods during the 1940's. Sheets for Ulster, Greene and part of Delaware counties were examined carefully. It was found that only a few of the peaks had elevations printed. These are presumably the only ones reached by ground surveys. Elevations for the others were determined by interpolation and are in parenthesis in the tabulation.

Because of the problem of multiple summits, some definition of a separate mountain has to be determined. Borrowing the principles established in "The Adirondack Forty-Sixers," but reducing figures proportionately, the following rule was established: In a range in order to be considered a separate summit—(a) there must be at least 250-foot drop between peaks *or* (b) a peak must be at least ½ mile away from others.



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High Peaks of the Catskills

Mountain	*Elevation in Feet**	*County*	*Town*
Slide	(4,180)	Ulster	Shandaken
Hunter	(4,040)	Greene	Hunter
Black Dome	(3,990)	Greene	Windham
Thomas Cole	(3,945)	Greene	Windham
Black Head	(3,940)	Greene	Windham
West Kill (a)	(3,880)	Greene	Lexington
Graham	3,868	Ulster	Hardenberg
Doubletop	(3,870) (3,850) (b)	Ulster	Hardenberg
Cornell	(3,865)	Ulster	Shandaken
Table	3,847	Ulster	Denning
Peekamoose	3,843	Ulster	Denning
Plateau	(3,840)	Greene	Hunter
Mink (Sugarloaf) (c)	(3,800)	Greene	Hunter
Wittenberg	(3,780)	Ulster	Shandaken
Balsam Lake	(3,725)	Ulster	Hardenberg
Lone	3,721	Ulster	Denning
Panther	(3,720)	Ulster	Shandaken
Friday (d)	3,694	Ulster	Shandaken
Big Indian	(3,680)	Ulster	Shandaken
Rusk	(3,680)	Greene	Lexington
High Peak (Kaaterskill)	3,655	Greene	Hunter
Twin (e)	(3,640) (3,580) (b)	Greene	Hunter
Fir	(3,625)	Ulster	Shandaken
Balsam Cap (f)	3,623	Ulster	Shandaken
North Dome	3,610	Greene	Lexington
Eagle	(3,605)	Ulster	Hardenberg
Balsam	(3,600)	Ulster	Hardenberg
Bear Pen	(3,600) (3,520) (g)	Greene	Halcott
Indian Head	3,573	Greene	Hunter
Vly	3,529	Greene	Halcott
Windham High Peak	3,524	Greene	Windham
Halcott	(3,520)	Greene	Halcott
Rocky	3,508	Ulster	Shandaken
33			
Bluebell (h)			

*As given on or interpolated from U. S. Coast and Geodetic Survey Maps. Figures in parenthesis are interpolated from contour lines.

With permission of the author, Daniel Smiley, of the Mohonk Lake Mountain House, Ulster County, we are happy to publish herewith (with preface by the author) a list of the high peaks of the Catskills (3,500 feet and higher) compiled, August, 1959, as a "Scientific Supplement" to Volume VI, No. 7 of "The Chirp", publication of the John Burroughs Natural History Society.

We agree with Mr. Smiley that this information should be of interest and value to hikers, hunters and others who enjoy the Catskill Mountains. —Editor

NOTES

(a) "Hollow Tree" mountain listed by Haring is, I believe, only a shoulder of "West Kill" because of the juxtaposition of "Hollow Tree Brook."

(b) Mountains having multiple summits have only the highest listed unless the name of the mountain indicates two.

(c) This mountain has been designated "Twin," "Sugarloaf" and "Mink" at different times and in different places. It was shown as "Twin" on the 1903 edition of the U. S. Coast and Geodetic Survey Map, Kaaterskill quadrangle. (See (e) below.) It was called "Mink" by Longstreth (1918) and Haring (1931). On the 1945 U. S. C. and G. map, Hunter quadrangle, it is given the name of "Sugarloaf." The name of "Mink" seems quite appropriate because of its relation to "Mink Hollow." A number of Catskill mountains could be called "Sugarloaf" based on having a flat top.

(d) "Friday Mountain" is so designated on "Map of Lands Belonging to the Forest Preserve Situated in the Counties of Delaware, Greene, Sullivan and Ulster," 1899.

(e) Apparently erroneously interchanged with "Sugarloaf" on the 1903 edition of the U. S. Coast and Geodetic Survey Map. (See (c) above.)

(f) "Balsam Cap" is designated "No. 4 Mt." on the 1899 map mentioned under (d) above.

(g) On the U. S. G. S. topographic map, edition of 1945, Prattsville quadrangle, the name "Bear Pen" is adjacent to the lower summit, which straddles the county line, being half in Delaware County, Town of Roxbury and half in Greene County, Town of Lexington.

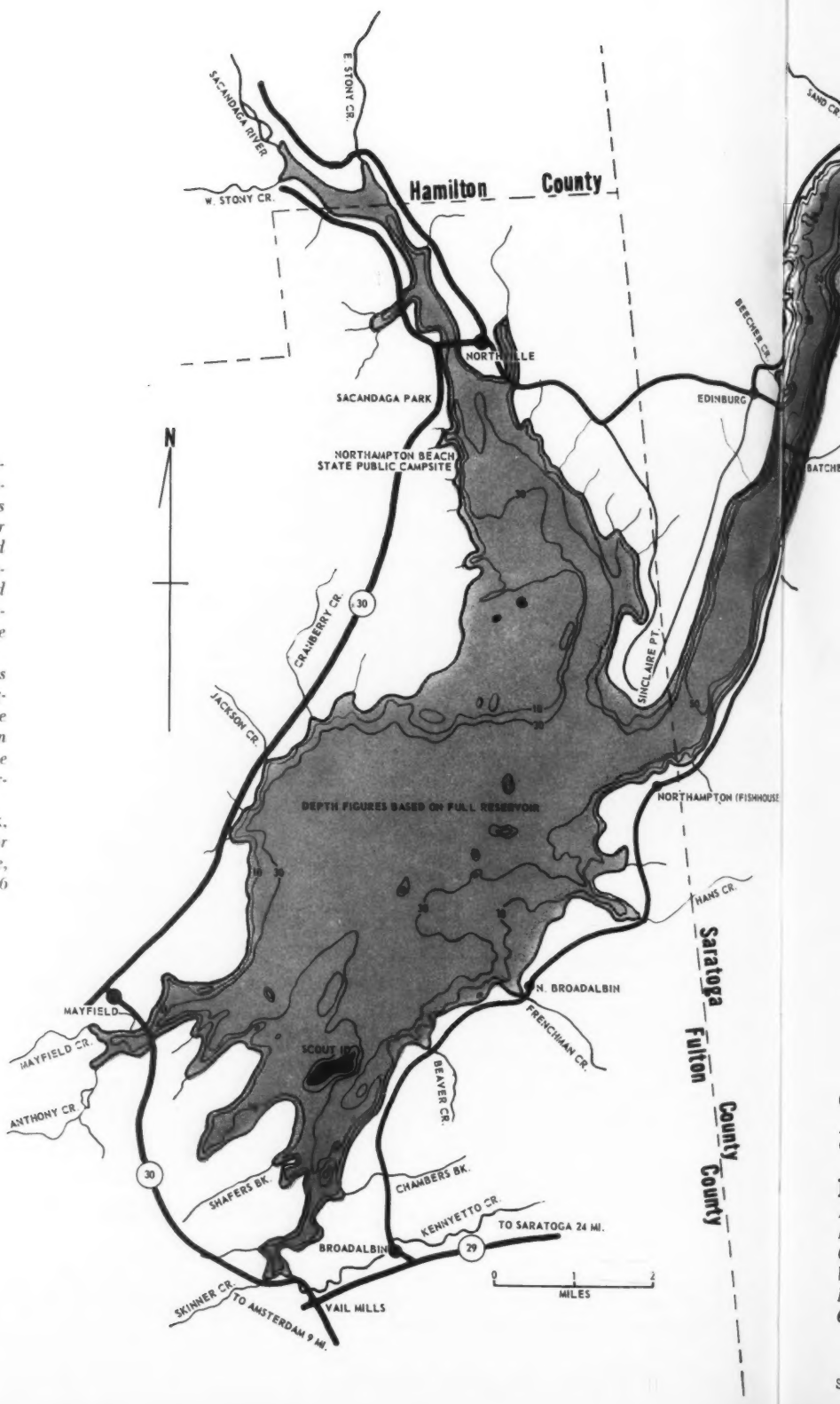
(h) "Bluebell" was listed by Haring, 3,565 feet. I have been unable to locate it, or associate it with any change of name.

General

Sacandaga Reservoir, under the jurisdiction of the Board of the Hudson River-Black River Regulating District, was completed in 1930. While the Reservoir regulates the flow of the Hudson and Sacandaga rivers, providing a conservation pool of water, minimizing floods and providing flow at drought stages, recreational and fishing values afforded are tremendous.

Tourist accommodations, boat liveries and bait dealers are available. The Regulating District has transferred to the Conservation Department jurisdiction over lands for a public beach, a campsite and a boat-launching area on the Reservoir.

—Robert G. Zilliox,
Regional Supervisor of Fish and Game, Regions 5 and 6



Sacandaga Reservoir

Sacandaga Sidelights

At 2:30 P.M. on March 27, 1930, engineers closed the gates of a great dam at Conklingville and the Sacandaga Reservoir began to fill with the waters of the Sacandaga River.

In June, 1940, Peter Dubuc caught a 46 lb., 2 oz. great northern pike in the newly-created lake. This was, and still is, a world record. Two years later, Dubuc made the anglers' headlines again when he caught a 10 lb., 6 oz. largemouth bass there which is tied for State honors.

During reservoir construction over a period of three years, 44 miles of road were relocated, three small villages and parts of eleven other hamlets were moved, and twenty-two cemeteries were excavated and established elsewhere.

Reservoir levels are subject to about a 30-foot fluctuation, with a high flow line of 771' above sea level and a low flow line of 740' above sea level. Between May 1 and Labor Day, bowing to recreational use, there is an agreement that the Reservoir level may be lowered no more than 15 feet.

Location

Principally in Saratoga and Fulton counties with arm extending into Hamilton County

Physical Features

Height of dam: 95 feet
Maximum depth: 70 feet
Elevation at high level: 771
Area: 26,700 acres
Capacity: 33.1 billion cubic feet
Shoreline: 125 miles

Chemical Characteristics

pH: Acid
Oxygen: Low in deeper waters

Hunting in Vicinity

Deer
Bear
Grouse
Varying hare
Bobcat
Cottontail

Fur-bearers in Vicinity

Beaver
Otter
Mink
Raccoon
Muskrat

Fish Present

Northern pike
Chain pickerel
Smallmouth bass
Largemouth bass
Pikeperch
Yellow perch
Rock bass
Sunfish
Bullhead
Carp
Suckers
Minnows
Trout (various species occasionally caught)

Above — Stony Pond, Madison Co.

Far left — Fishing off the dike

Left — Small trout but a big smile

Right — Peninsulas add fishability in pond construction

Stony Pond

An Adventure in

by G. B. Elliott,
Conservation Biologist,
N. Y. S. Conservation
Department

THERE is a great deal of public discussion these days about the need for more publicly-owned lands and water for recreational use. A rapidly increasing population, with more and more leisure time on its hands, is creating heavy pressure on many of the existing public and private recreational facilities—not only for hunting and fishing but for camping, hiking and all the other activities that go with vacation time in the outdoors. The need for more recreational facilities in central New York is evident when one looks at the large number of cities and incorporated villages located throughout this area. The people of this section are so far removed from the large wild land areas of the Adirondack and Catskill Forest Preserve that they must seek their outdoor recreation nearer home.

Some 30 years ago, the State Conservation Department embarked on an intensive program of acquiring submarginal agricultural lands in central and western New York and in the eastern and northern counties outside the Adirondack and Catskill parks. The object of this program was two-fold; first, to retire from agriculture submarginal farm lands at the higher elevations and on the poorer soils which no longer provided a means of efficient livelihood; secondly, to develop these tracts into economic forest units through reforestation. Thus, they have been called reforestation areas and, more recently, simply State Forest areas. In the aggregate they comprise some 600,000 acres in tracts of from 1,000 to 8,000 or 9,000 acres in size.

At the same time, the Conservation Department embarked on a somewhat parallel program of acquiring tracts for game management purposes. There are now 34 of these Game Management Areas averaging about 3,000 acres in size.

These State Forest and Game Management areas, as they became developed with access roads and coniferous plantations, have become increasingly attractive to the public for recreational purposes and, as the need for integrating the various forms of recreational use and development became more apparent, the Division of Lands and Forests and the Division of Fish and Game have worked more and more closely together in a multiple-use program in which forestry, wildlife management and recreation all have their part.

Under this multiple-use approach, the impoundment of small to medium-size bodies of water is an increasingly important and popular feature of development. Such impoundments serve the purpose of water conservation, wildlife habitat improvement, fishing and, where conditions are suitable, a limited amount of picnicking facilities. A case in point is the 37-acre pond just created through the joint efforts of Forestry and Fish and Game personnel on the Madison Reforestation (State Forest) Area No. 13 near the Village of Nelson in Madison County. This small lake has been named Stony Pond. Before construction work began, a direct observation of the pondsite might have substantiated the notion that this was "just another mud hole" in contrast to the romantic image of blue water surrounded by evergreen forest. Dead trees and brush, overgrown meadows and an abandoned beaver dam were all that was visible in the pond area. Neverthless, even before the beaver had set up housekeeping there, some of the Conservation Department personnel could foresee the possibilities of the site.

Multiple-Use Planning

Following recommendations made by the Fish and Game Managers and the District Forester, the Fish and Wildlife Management Board of District No. 2 lent its support to the project. As one of its initial projects for the year 1959, this F.W.M.A. Board recommended to the Conservation Department the construction of a pond on this site, and the consideration in the light of present-day needs, of all appropriate recreational uses of the area.

The job was undertaken with enthusiasm and with a complete unity of effort by the two Divisions. Game personnel cleared the trees and brush from the wooded areas and, with an assist from the Forest Ranger force, burned off the impoundment area. Tools, lumber and other equipment borrowed from the State Game Farm were used by Department engineers and Game Management men who supervised and built the dike and emergency spillways. The cost of pond construction was borne equally by the Bureaus of Fish and Game.

Peninsulas were built out into the pond to serve as breakwaters, duck nesting areas and fishing piers. These peninsulas built from "spoil" taken from the emergency spillways and the bottom clearing operation, will give the shore fishermen, along with the boat fishermen, equal access to the "deep water."

When construction work was completed and the pond site ready to be filled, Fish Management personnel moved in to eradicate all undesirable fish species in the stream system leading into the pond. Because the pond, when filled, will have a maximum depth of 12 feet and almost one square mile of watershed, well supplied with small streams and cold springs, Fish Management personnel are hopeful of success in management for trout. Accordingly, an initial stocking of rainbow trout was made in November, 1960. This was followed by stocking of brook trout in early spring, 1961. Results of this trout stocking will be evaluated together with a study of summer conditions. Should this evaluation study indicate unsatisfactory conditions for trout, then a change will be made to warm-water species.

The benefits which hunters will receive from this pond are about as important as are the benefits to fishermen. During the brush and tree clearing operation, Game Management personnel noted pairs of ducks feeding in the small streams and marsh areas. Flocks of geese on their spring migration flight were observed flying low over the area. We're confident it will not take long for waterfowl to move into these newly-created quarters.

It may be possible to provide nesting areas for ducks and resting and feeding areas for geese as well. A re-examination of the topographic survey maps revealed that approximately 14 acres of relatively shallow water (less than 5 feet deep) was present in the upper end of this pond site. This 14-acre area, plus one small island has an ample protective cover of willow, hemlock, marsh grass and cattail to make it an excellent nesting and resting area. Duck nesting boxes were erected and, to insure that land predators would not encroach on the island nesting area, a deeper channel was bulldozed between it and the mainland. The dike and spillway areas were planted with winter wheat and birdsfoot trefoil, not only to hold the soil against erosion, but also to provide "green food"—an essential element in the diet of ducks and geese.

Future management for fish and game will be carried out with an eye toward improving habitat conditions for established species as well as investigating the possibilities of introducing new species when conditions warrant such a change.

In planning management of the area for recreation, there must be considered not only the uses and pressures to which the area will be subjected, but also the suitability and limitations of the site for a particular use. In the present instance, it seems apparent that this body of water will be valuable primarily as a fishing area and that picnicking will be somewhat limited and in considerable part, incidental to other use.

In the use of these or other public lands under the jurisdiction of the Conservation Department for recreational purposes, the general regulations of the Department concerning their use will, of course, prevail. Since this is primarily a pond for fishing, certain fish and game regulations will apply, such as prohibition of swimming, use of motors on this small body of water, overnight mooring of boats and use of fish as bait. Other regulations of the Division of Lands and Forests include prohibition of littering, building of open fires, and camping for more than three days without a permit.

Surely, these regulations cannot be considered unreasonable when viewed in the light in which they are intended —to preserve and maintain an area primarily for fish and wildlife but open to the public for general and appropriate recreational use.

the back of the book

Go to the fair

Don't miss the conservation exhibits at the New York State Fair this year. They are "bigger and better." A new exhibit area will be located just west of the main gate and adjacent to the "fish pool."

Here, forest recreation will have a full scale tent campsite, typical of those in the Conservation Department's 38 plus campsites and 40 of its State parks.

Forest Fire Control will demonstrate a full scale fire observation tower in operation—a danger weather station and a complete line of forest fire fighting equipment. Here you can have your picture taken, too, with Smokey Bear.

Then follow the life story of a forest tree seedling from nursery to wood products, as told through exhibits of Forest Management and Nurseries.

Having trouble with "bugs" that eat foliage of your trees? Forest Pest Control will have some 15 different species of forest insects and pests on display with examples of their destructive habits, and they will tell you how to control them.

For those with tired feet there will be benches and an Adirondack lean-to where you can take time out to read, and, we hope, secure a new or renewal subscription to New York's award-winning magazine, THE CONSERVATIONIST.

The conservation building will house its usual display of fresh-water fish in the big "see through" aquarium tanks and fair-goers will have a chance to see THE CONSERVATIONIST wildlife artist, Wayne Trimm, at work on new paintings.

Marine advisors

A 10-man Marine Fisheries Advisory Committee, representing shellfish farmers, baymen, commercial fishermen and salt-water anglers, has been established by Conservation Commissioner Harold G. Wilm to assist and advise the Department in the complex problems of strengthening management and administration in the marine area.

The Advisory Committee members, selected because of demonstrated interest and broad experience in various phases of marine fisheries problems, represent the Sportsmen's Council, Marine District of New York State, Inc.; Atlantic Processing Co.; Shellfish, Inc.; Nassau County Fish and Game Association; Suffolk County Fish and Game Association; Easthampton Baymen's Association; Long Island Fishermen's Association; Huntington Baymen's Association; Long Island Shellfish Farmers' Association; and an outdoor writer of the Metropolitan and Marine area.

The committee, working in co-operation with the Department, will make sure that New York's commercial fishery, valued at nearly $10 million per year, and the marine sport fishery, utilized each season by more than 600,000 anglers, will receive the best in progressive planning.

Stream improvement

During the past year, improvement measures were carried out on 32 public fishing streams throughout New York State.

The work included clearing debris from the channels, putting up fences to protect the streambanks from cattle grazing and subsequent erosion, planting willows and dogwood for streambank cover and stabilization and building dams, deflectors and other structures to create pools and cover for trout.

In addition to the habitat improvement measures, Dr. C. W. Greene, chief of the Department's Bureau of Fish, said that about 20 miles of public fishing waters were marked with identification and access signs for the benefit of anglers.

Multiple use

Two discarded pheasant egg incubators are being used for drying fruits and seeds of wildlife food plants at the Painted Post shrub nursery.

Hiking trail changes

Some of the hiking trails maintained by the Conservation Department cross private land to gain access to State land. Most of these crossings are covered by an agreement with the landowner and are open to the public the year 'round. In some cases, however, the owner has seasonal restrictions on the use of such trails, and in a few cases there is no agreement in effect for limited sections, or, the trail may be closed by the landowner. Here are listed trails that are known to have been closed in the past. If a hunting or hiking trip is planned in any of these areas, a check in that particular locale should be made to see if the trail will be accessible for use. This can be done through the local Forest Ranger.

Indian Head Trail—Vicinity of Platte Clove in Greene County, Town of Hunter.

Puffer Pond Trail—Vicinity of Indian Lake in Hamilton County, Town of Indian Lake.

Northville-Lake Placid Trail (Benson Section)—Vicinity of Benson Center, Hamilton County, Town of Benson; (Whitehouse Section)—Vicinity of Whitehouse, Hamilton County, Town of Wells; (Piseco Lake Section)—Vicinity of New York Route 8, Hamilton County, Town of Lake Pleasant; (Cedar River-Blue Mountain Lake Section)—Vicinity of Cedar River, Hamilton County, Town of Indian Lake.

Recreation proclamation

Recreation, once frowned upon as a waste of industrious people's time, is now recognized as a necessity for the well-being of a nation's people.

New York's Governor Rockefeller, realizing the importance of healthy recreation to industrious people, proclaimed June this year as "Recreation Month." Here are a few excerpts from the Governor's proclamation:

"We are now in a period of history

when citizens of our State—and of our country—have more leisure time at their disposal than any other peoples in the world. At the same time, the exacting conditions of modern life make healthy recreation no longer a luxury but a necessity.

"Each year, millions of family hours are shared in outdoor recreation at 87 State parks strategically located in every section of the State. Within this network every popular form of family recreation is available. In addition, city, town and county parks throughout the State draw capacity crowds on day-trip excursions for picnicking, bathing, boating, fishing and outdoor sports.

"The State's renown as an outdoor playground stems from its endless variety of scenic attractions — including more than 8,000 lakes and more than 2,000 mountains, besides a profusion of water falls, glens, forests, river valleys and more than 100 miles of Atantic Ocean beaches.

"Attendance at our State parks totaled 31 million in 1959. Nearly one-fifth of the total population of both the United States and Canada is within approximately half a day's drive from one or another of our State parks and our great natural playgrounds—the Adirondacks and the Catskills.

"Because of the State's rapidly expanding population and its growing popularity as an outdoor playground, our citizens last November voted approval of a $75 million bond issue which makes possible the rapid acquisition of more open lands for recreation so that simple outdoor recreation will be assured to future generations of New Yorkers."

The cluster-fly

The cluster-fly (*Pollenia rudis*) is well-known to most housekeepers because of its habits of entering houses in the autumn and hiding away in protected nooks in large groups or clusters. A handful of these flies can often be found as single clusters in the corners of rooms, beneath garments hung up in closets or under curtains at the windows. They are a nuisance and a source of considerable annoyance, not from the damage they do, for this is slight, but because of their noisy presence. They are unwelcome guests at any time.

The cluster-fly is a European insect and just how or when it came to this country is not known. It could easily have hitchhiked a ride on board ship, for it would as readily enter a ship lying in port on an autumn day as a dwelling house. From its habit of hibernating in clusters all winter it could take several rides back and forth across the ocean before spring. In a list of flies published in 1864, it was shown as common to Europe and America so it must have arrived here some years before that date.

The fly is somewhat larger than the housefly and appears longer and narrower. The wings, when in repose, overlap each other, bringing the outer edge of each almost parallel with the sides of the abdomen. This position of the wings gives the effect of narrowness when viewed from above. The wings of the housefly when in repose stand out at a considerable angle to the abdomen. The thorax of the cluster-fly bears many short, golden hairs and is of a uniform coloration lacking the light and dark lines of the housefly. The abdomen is grayish but inclined to be iridescent, and thickly set with hairs, especially at the posterior end and along the sides.

Normally the cluster-fly lives out of doors, frequenting the flowers and fruits of plants. The eggs are laid on the soil partly hidden in the cracks and crevices. Here the eggs hatch in about three days and the young active maggots penetrate the bodies of earthworms and live as internal parasites within the bodies of the worms for thirteen to twenty-two days and then transform to pupae. The pupal period lasts about two weeks and the whole life cycle from twenty-seven to thirty-nine days. There may be several generations—perhaps four—during the summer.

Since the cluster-fly lives as a parasite on earthworms it seems quite impracticable—if not impossible—to adopt any measures by which the breeding of the flies might be prevented. Methods of control must be directed against this insect after it has gathered in groups in the buildings which it frequents during the winter months. Screens afford little protection against cluster-flies because they usually enter through small cracks. Fortunately, the cluster-flies are often subject to a fungus disease, which kills many of them, en masse.

Operation outdoors

The U.S. Forest Service's "Operation Outdoors" includes planting shrubs, grasses and herbaceous plants on 1.5 million acres of game range; clearing openings, developing food patches, and game ways for wildlife in dense vegetation on 400,000 acres; and enhancement of 7,000 miles of fishing streams and 56,000 acres of lakes by stabilizing banks, planting streamside cover and constructing channel improvements. The cost is estimated at $25.6 million over a 10- to 15-year period.

Copies of "Operation Outdoors, Part 2," may be obtained by writing the Director of Information, U.S. Forest Service, Washington 25, D.C.

Televised boating

An experiment in education television should bring greater safety and enjoyment to the State's waterways.

The Conservation Department's Division of Motor Boats is co-operating with the Mohawk-Hudson Council on Educational Television to produce a series of 13 half-hour programs covering the Young Boatman's Safety Course. The course will provide an opportunity for youngsters, 10 through 14 years of age, to acquire the classroom knowledge required for taking the test that may lead to earning a Conservation Department Boating Safety Certificate, now required by law before children 10 to 14 may operate a motorboat alone on State waters.

"Benny" DeLaMater

Benning W. DeLaMater, well known Game Protector of the Albany Division, lost his life in an unfortunate boating accident on the Hudson River in June of this year.

"Benny," as he was known to most of his friends, had been with the Department as a conservation officer for the past twelve years. He was a member of the Albany County Pistol Club, Watervliet Rod and Gun Club, Bethlehem Sportsmen's Association, Albany County Special Game Protectors' Association and the New York Civil Service Chapter of Game Protectors. He was well known for his conservation work with youth groups.

During World War II, Benning served with the Marine Corps and prior to that, he had attended Siena College.

Anniversary

This year's June-July issue of THE CONSERVATIONIST was a milestone—with it we completed fifteen years of publication. We're proud of this feat; but not, by any means, to the degree of sitting back in an aura of self-satisfaction. On the contrary, we recognize, even more acutely, the needs and objectives set forth as a preamble in our very first issue—"to bring the vital story of conservation to your front door—to report with candor on our mutual problems—that we may find common ground where, by mutual assistance, we can do a better job for our forests, our fish and game and our other God-given resources."

These needs are even more demanding today than they were fifteen years ago; finding "common ground" an even greater challenge. We would ask no more than that THE CONSERVATIONIST shall continue to share the opportunity to help meet this challenge.

A brief review of our past may be of interest to our readers, some of whom have been with us since Volume 1, Number 1 of August, 1946. From the August, 1946 issue to April-May, 1947 issue we had limited color—the first and fourth covers were bordered in red, with black and white photograph insets. Second and third covers were black and white scenes, charts or maps. The Inside on the Outdoors feature, which only recently ended with the retirement of Clayt Seagears, started in that first issue.

Four-color first covers first appeared in the June-July 1, 1947 issue, and four-color fourth covers with the August-September issue of that year. The magazine has utilized the Department's fish plates from its Biological Surveys volumes; the New York State Museum's wildflower and bird plates; and has had the loan of many outstanding pieces of art from museums and other publications. In more recent years it has developed many original four-color covers, centerspreads and illustrations of its own. From its inception, color in some form, has been used.

The lakes series began with the August, 1946 issue and has continued intermittently to cover most of all of the larger and more popular lakes of the State. The counties maps series began in February-March, 1949 and concluded with June-July of 1958. These maps have shown a variety of State facilities and other information of special interest to the sportsman and vacationer. Both county maps and lake charts are available in reprint form as Informational Leaflets.

Other regular features have included Scattershots and For Your Information departments that are now included in The Back Of The Book. The Letters to the Editor section began under a heading of What's Bitin' Ya? in the April-May, 1947 issue. Its popularity is reflected by the fact that many CONSERVATIONIST readers begin at the back, with the letters and read forward.

The magazine started with 32 pages and was increased to 48 pages with the April-May, 1955 number when the original subscription rate of $1 a year for six issues was increased to $2 a year for six issues.

The body of the book has been replete with articles on various phases of conservation, now indexed for reference under 82 subjects. Articles in the early days were prepared by staff and Department personnel for the most part, with now and then a guest author, but over the years the magazine has drawn more and more on "outside" writers who have given freely of their time and knowledge in their various fields of natural resources research and management.

The number of subscribers has grown steadily from a few thousand to more than 76,000. Readers have been the magazine's best salesmen. Subscribers are from every state in the Union and at last count, 49 foreign lands.

The magazine goes into public libraries, schools, colleges and universities throughout the State; teachers utilize its contents particularly the centerspread features, as instructional aids; reprints of its articles are in growing demand as Informational Leaflets.

THE CONSERVATIONIST strives to maintain a high level of factual information and craftsmanship. It has succeeded to a degree as evidenced by its selection the last two years as outstanding in its own category from among thousands of publications submitted for hanging in the 18th and 19th Exhibition of Printing in New York City. We must have succeeded reasonably well in furnishing information, too, for, in competition with other states' publications of its kind, we received the top National Award in 1959 by the American Association for Conservation Information, and second place in 1960.—R. B. MILLER

Federal Aid, 1961-62

Federal Aid funds amounting to well over $12\frac{1}{2}$ million became available July 1 for fish and wildlife projects in the 50 states. New York will receive $276,220.26 for wildlife (P.-R.) and $81,214.06 for fish (D.-J.). This is an early apportionment to help states program their Federal Aid activities advantageously. The balance of federal funds accruing to the program for the year ending June 30, 1962 will be apportioned in October.

The federal fish and wildlife restoration programs require states to spend their own funds on approved projects and then reimbursement is made up to 75 per cent of the cost.

The restoration funds are derived from the excise tax on sporting arms and ammunition, and on sporting rods, reels, creels and artificial lures. Distribution of the two funds is made on formulas based upon the number of paid license holders in each state and on its area.

Mouthful

A Missouri Conservation Agent found a starling in a bullfrog's stomach.

Ash die-back

A virulent new disease of unknown origin has been killing off the white ash trees in many parts of the State. Ash trees of all ages are affected, from seedlings to mature specimens. A partial survey of eastern New York has revealed that 64 per cent of the white ash are dead or dying in 18 counties (Albany, Broome, Clinton, Columbia, Delaware, Greene, Jefferson, Lewis, Orange, Oswego, Otsego, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Sullivan, Ulster). In commercial wood lots up to 70 per cent of the ash trees are in various stages of decline as a result of this disease.

Other sections of the State will be surveyed this year to determine the extent of damage from the tree-killing malady. The study is being conducted by the State University College of Forestry at Syracuse in co-operation with the Conservation Department's Bureau of Forest Pest Control.

Ash die-back may have a serious impact on wood-using industries that depend on white ash. Ash is used extensively in the manufacture of furniture, tool handles, toys, woodenware and novelties as well as baseball bats.

An intensive research program to find out what causes "ash die-back" and development of control measures is a must or the white ash may go the way of the American chestnut.

Oneida Lake pollution study

Oneida Lake is a most valuable recreational center for central New York. Each year thousands of people are attracted to it seeking relaxation in the form of swimming, picnicking, boating, fishing or just plain vacationing. Few, if any, are ever disappointed with the recreational facilities.

The Oneida Lake Association an organization of individuals from all walks of life, united with a common interest, that of preserving those conditions in Oneida Lake which have made it so popular, aims to keep it that way. They, like many others in the area, have become increasingly anxious about the continuing upward trend of pollution in the lake. So keen has been this interest that in the past year the Association initiated a study of the pollution problem, financed jointly by the New York State Health Department.

The study proposes to determine the degree and distribution of pollution now existing in the lake and to make recommendations for any necessary future study and for abatement. Specifically, the study will include on-the-spot determinations of temperature and dissolved oxygen concentrations. The 5-day B.O.D., Coliform bacteria density, pH, hardness, alkalinity, chlorides, free CO_2, suspended solids, nitrates and phosphates and algae will be determined by laboratory analyses.

The lake surveys will consist of at least three major studies, one during each season of the year, except winter, and weekly studies run at stations which appear to be characteristic of conditions in the lake.

Stations to be sampled on major surveys will include 13 lake locations and 20 influent creek locations—five each at Chittenango, Canaseraga, Oneida and Fish creeks. There will also be one station in the Oneida River at Brewerton.

The major seasonal surveys will indicate the conditions in the lake during those seasons, while the weekly monitoring runs will supply transitional data from one season to another. The weekly runs will give advance warnings of drastic changes, such as threatening algae blooms which may be about to take place in the lake.

The information obtained from this study will be used as the basis for further study of the pollution sources and their final abatement. — PROF. NELSON NEMEROW, *Syracuse University*

Oyster raft

A fiberglass raft has been designed and built to support the weight of 25 bushels of marketable oysters for off-the-bottom growth. The raft is a rectangular box with horizontal wings on each long side. The box is 12½ feet long, 16 inches wide, and 8 inches high. The wings are 12½ feet long, 10 inches wide, and ⅛ inch thick. A hole, one inch in diameter, is drilled at each end for the attachment of a mooring line. Cost, $225.

The raft weighs about 70 pounds and can easily be carried by two men. It is so designed that either the top or the bottom can rest in the water. Annually the raft is turned over and all fouling organisms are scraped off.

The fiberglass raft has been moored in ten feet of water at Taylor's Pond, South Chatham, Massachusetts, since August 18, 1958. It has been subjected to strong winds and winter icing without any damaging effects to the structure. To date, use of the raft has proved successful as a method of growing oysters off the bottom.—BUREAU OF COMMERCIAL FISHERIES, *Woods Hole, Massachusetts*

Evaporation control

A study of some of the biological effects of hexadecanol, sprayed on water surfaces to suppress evaporation from reservoirs, reveals some interesting findings.

It caused no mortality among fish in aquaria maintained on a diet containing 50 per cent hexadecanol for periods up to 91 days. Trout planted in a treated pond showed the same growth at the end of one year as those planted in an untreated pond.

Film coverage on treated ponds varied directly with wind force, but averaged about 33 per cent. In general, film coverage was complete only during dead calm periods; was 30 to 100 per cent complete with winds up to seven miles per hour; and was less than 30 per cent complete when wind exceeded seven miles per hour.

There was no noticeable effect of hexadecanol on dissolved mineral content and temperature of the surface waters of treated ponds averaged 2.6 to 3.8 degrees Fahrenheit warmer than that of untreated ponds. The presence of a thin film of hexadecanol on the water did reduce the strength of the surface film by more than 55 per cent. As a result, large water striders may fall through such weakened surfaced films and drown. It was noted that emergence of some aquatic insects was hindered by this same phenomenon.

Over-all, most biological effects of the chemical appeared to be small in magnitude and well within the range of natural variation.

The coyote

The coyote is one of the most versatile and cunning of all the wild animals. This cunning, coupled with its medium size and shy retiring nature, assures his survival under most conditions.

The Living Cycle

(Continued from page 24)

build animal protein. Meat-eaters prey upon the plant-eaters. Both animal groups use oxygen and release carbon dioxide. Waste products from both plants and animals, along with dead tissue, are digested by bacteria and fungi bringing chemicals back into forms that can be used again for repeating the cycle. This cycle may take place on the land or in the water, the species may vary, but in the final analysis the result is the same — sun's energy used to create tissue from chemicals, alteration from plant to animal tissue, death and breakdown by bacterial action and once again the chemicals are available for use. On the balance of this cycle depends our hunting and fishing.

The Watershed

(Continued from page 25)

Solubility, and hence availability to plants, of these chemicals is influenced by the relative acidity or alkalinity of the water. This is affected by the proportionate amounts of calcium, carbon dioxide and oxygen along with other chemicals. Interrelation of plants using carbon dioxide and releasing oxygen, and animals reversing the procedure play their part in affecting acidity. So also do bacteria by breaking down tissue into nitrates in the well oxygenated waters and into marsh gases in the poorly aerated waters below the thermocline (temperature line). Above the thermocline water is frequently in motion and is well aerated, but colder, heavier waters remain fairly still. Poor light penetration at lower depths limit plant growth so the only oxygen source is when, in spring and fall, the cooling of the surface water makes it heavier than bottom water and temperature currents are established. Then bottom nutrients are brought to the surface and aerated waters reach the bottom. This is the environment in which, when well balanced, plants and animals thrive and our fish and waterfowl prosper.

Ducks Unlimited

The nation's leading privately-sponsored migratory waterfowl conservation organization, Ducks Unlimited, has appropriated $550.000 to continue the work of restoring and building duck breeding grounds in the Canadian Prairie Provinces in 1961. This is the sixth successive year the group has allocated a half-million dollars or more for the development of "duck factories."

More than $7.500.000 — which U.S. duck hunter-sportsmen have contributed —has been used for the work of building or restoring more than 600 of the waterfowl breeding grounds in Canada. This is where more than 65 per cent of the continent's migratory waterfowl raise their young, but where duck stamp funds for this purpose cannot be used because it is outside the territorial borders of the United States.

During the 23 years of DU's existence, 633 projects have been built or restored, 74 of these have been retired or consolidated with adjoining projects, leaving 559 active "duck factories" in production with a shoreline mileage of close to 5.000 miles, in the Provinces of Alberta, Manitoba, Saskatchewan and New Brunswick.

Opportunist

The No Parking sign was enough protection for this tomato to germinate, take root and produce at the doorstep of the Conservation Department's offices on the State Campus.

Nourishment seems pretty well limited to granite, asphalt and cement.

Exotic problem

A fern, native to South and Central America and the larger Caribbean Islands, is threatening Kariba, one of the world's largest man-made lakes on the Zambesi River in Africa. How the plant was introduced into the lake, or even into Africa, is a mystery. The plant, an attractive fern, may have been brought to the upper Zambesi in the last century by a missionary for an ornamental.

The first signs of the plant were a few floating fronds on the lake in March of 1959. In a little over a year it spread to cover nearly 200 square miles and today it is growing faster than ever. The present area of the lake is 1.000 sq. mi.

This plant poses a serious threat to the new lake and reminds us of the serious economic and biological problems caused by water plants introduced into the United States by well-meaning but not so well-informed people. The water chestnut and the water hyacinth are two examples.

Deer hunters' paradise

We have our troubles with deer, but New Zealand's problems begin where ours leave off.

So abundant have deer become in that land that serious erosion results from the nearly complete eat-outs of woodland cover in many areas.

To stem the rising deer tide, the New Zealanders have adopted measures that would, in some cases, bring joy to the hearts of our big game hunters, and some others—tears of anguish. On the joy score, one may hunt deer there without a license, anytime of year and there is no bag limit. What's more, the government will furnish the ammunition.

But even that hasn't brought about the desired control so, in addition—and here's the anguishing note—the government hires professional hunters to help out, and they take as many as 2,000 deer a year.

Even so, the deer are gaining; the problem worsening. So if you don't mind travelling a few thousand miles for your deer—New Zealand will welcome you.

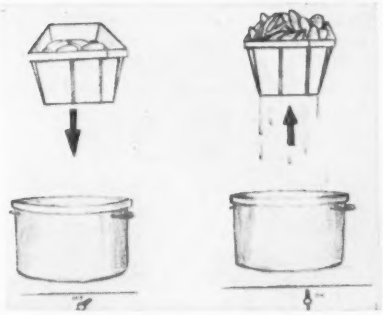
Slaughter

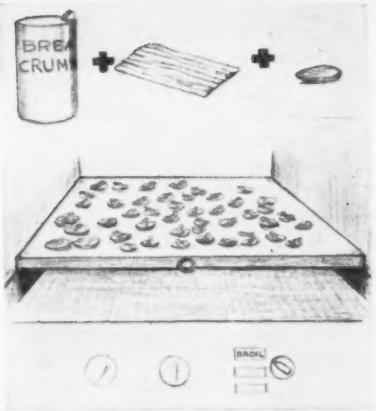
The American buffalo suffered its greatest slaughter from 1872 to 1874. It is estimated that well over 5 million animals were killed during this period.

Golden introduction

The golden retriever was first introduced in the United States from England in about 1900.

It's clambake time





The flavorful clam is a true gourmet's delight.

Called "quahaugs" by the Indians—but known in the trade as "little necks" and "cherrystones," according to size, the hard shell clams are without a doubt one of Nature's most perfect delicacies. Healthwise they supply a daily requirement of minerals and of vitamins A, B, D and Riboflavin. For diet-conscious people they contain 9 per cent protein but only 1 per cent fat.

The cool tidal waters of the many bays that make up Long Island's shoreline provide the major part of this shellfish harvest. Cultivation, harvest and marketing of the Long Island clams is under the supervision and regulation of the Conservation Department's Shellfisheries Management Unit. A modern sanitation and biological laboratory is maintained by the Unit at Freeport, Long Island, where marine waters and shellfish are continually examined to see that only a quality, wholesome product reaches the market.

Here are a few favorite ways of preparing the hard clams for picnics, barbecues and the time-honored "clambake":

Baked clams — Place cherrystone-size (medium) shell clams on side, as close to hot coals (briguets preferred) as possible until shell opens slightly, then turn to other side for an additional five minutes. Remove meats with fork and dip in hot butter—nothing else needed.

Steamed clams—Place little neck-size (small) shell clams on rack in deep pot. (Clams may be placed in quart-size strawberry baskets to facilitate handling and serving). Add ½ cup of water to each quart of clams, cover the pot and place over fire, when shells open (about ten minutes' steaming) remove from fire. They're ready to eat, with a hot butter dip.

Broiled clams—Use little neck size. Remove one shell, leaving clam meat and the juice in the other shell. Place on cookie sheet or use small muffin pan and dot each clam with a small piece of butter or substitute a small piece of bacon. Place pan under broiler for just five minutes and they are ready. Don't overcook or they will be tough.

Happy picnicking!—HAROLD F. UDELL, *Marine Fisheries Sanitarian*

Bear facts

The average weight change of 21 bears transferred less than one mile from line-trap sites in the Adirondacks showed a gain of 53 pounds. Nine bears transferred more than one mile from the trap sites showed a gain of 42 pounds when retrapped. Weight increases varied from zero to an astonishing 230 pounds for eight bears tagged in 1956 and retrapped in 1957.

Twelve bears that were trapped twice in 1957 showed significant weight increases in most cases when the interval between captures was more than three weeks. A gain of 92 pounds was recorded for one bear caught in June and again in July. Another large gain of 81 pounds in 24 days was recorded.

Mechanics of migration

The annual migrations of vast numbers of waterfowl have always awed and mystified mankind. When the sky is full of ducks as far as we can see or when we hear a distant honking and discover a great V of geese overhead, we wonder where they came from, where they go and how they find their way so surely back and forth each spring and fall.

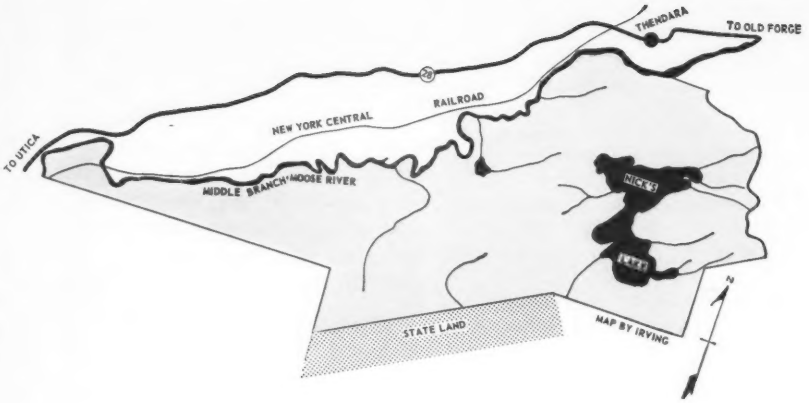
Some ornithologists like to believe that birds have a sixth sense—a sense of direction—which is absent or poorly developed in humans. Others surmise that they have magnetic awareness—a sort of compass-like sense, or that they navigate by the sun. Still others insist that birds are guided by inherited memory or hereditary knowledge or merely by a convenient instinct. None of these theories explains, satisfactorily their behavior under all conditions. The manner in which birds find their way over thousands of miles of migration routes to their winter grounds and back to the very spot where they nested or were hatched the previous year, continues to be a mystery.

Since 1885, the U.S. Fish and Wildlife Service has been accumulating information on the migrations of waterfowl. Much of it is based on the records of a great number of banding stations and other co-operators. Since 1910, several million ducks and geese have been banded and several hundred thousand returns have been received—records of where and when banded birds were killed by hunters, captured by other banding stations or recaptured by the original station in subsequent years.

This information established the fact that waterfowl, with few exceptions, move south and north between their traditional breeding places and wintering grounds through regular migration routes. Further, that there are four (broad) flyways in North America: Atlantic, Mississippi, Central and Pacific.—NATURE BULLETIN, *Forest Preserve District, Cook County, Illinois.*

Gamesmanship

Acousticon International has noted a rising market for its hearing aids among hunters who use the amplifying instruments in stalking game. Now it reports a new off-season market. Game wardens are buying hearing aids as an assist in tracking down poachers.



Nick's Lake campsite

The Nick's Lake Tract in the Town of Webb, Herkimer County, has been purchased at a cost of $275,000 under the $75 million bond issue for park and recreation lands. Located about two miles south of Old Forge, the 3,747-acre tract includes the 220-acre Nick's Lake with 24,000 feet of lake frontage and nearly 24,000 feet of frontage on the Middle Branch of Moose River.

The irregular shoreline makes it especially attractive for development, while the lake itself offers the added recreational values of swimming, fishing and boating in a peaceful woodland setting. During the fall months, public hunting will be an added dividend.

Nick's Lake is one of the few remaining undeveloped lakes in the Adirondacks that is easily accessible. The tract is in a district that, within recent years, has become increasingly popular as a summer vacation center and is within easy reach of a large segment of the State's population. The future campsite is 100 miles from Syracuse, 140 miles from Albany and 185 miles from Rochester. There is ample space along the lake front for development of up to 500 tent sites and eventually sites can be developed along Moose River when additional camping facilities are needed to meet the public demand.

Date for the start of actual construction cannot be set until the official transfer of title is completed and funds are appropriated for planning and development.

Wildlife Federation awards

Conservation educational grants have been made to 34 students for the 1961-62 academic year by the National Wildlife Federation. The program includes 14 scholarships and 20 fellowships and amounts to nearly $25,000.

New York staters awarded grants are Kaye L. Christopher of Marathon (Cornell University), $500 for undergraduate work in conservation education; Allan E. Moose of Geneseo (State University College of Education), $500 for undergraduate studies in early secondary science education; Harrison H. Payne of Pawling (Cornell University), $1,000 for graduate work along a nature study-conservation theme; and Edward F. Schlatterer of Brooklyn (University of Michigan), $1,000 for graduate work on the influence of disease and parasitic organisms on the population level of ruffed grouse.

During the 11 years of the Federation's grants program, a total amount of $226,389 has been awarded. Of this total amount, $129,130 has been granted as scholarships and fellowships to 169 students in the various fields of conservation, with the balance for projects in the field of natural resources. This conservation education program of the Federation, like all others, is made possible through voluntary contributions received in return for the Wildlife Conservation Stamps.

ED. NOTE: *See feature article, this issue, for more about the National Wildlife Federation.*

Snorkel trail

The National Park Service has something new in the way of nature trails. At the Virgin Islands National Park's Trunk Bay, a self-guided swimming trail has been developed complete with underwater plaques explaining the unusual features of the marine life in the surrounding waters. Using goggles and snorkel tubes, the swimmer is given an opportunity to see and understand more about the many colorful species of fish and plant life among the coral reefs.

Turkey transfer

A joint effort is being made to introduce the wild turkey to our neighboring Bay State. At the request of Massachusetts Fish and Game authorities, eleven wild turkeys were live-trapped during February this year, tagged and transferred by truck and toboggan from New York to the Mount Everest State Reservation in Berkshire County.

The birds, consisting of eight hens and three toms were trapped with a cannon net by game biologists near Margaretville in Delaware County. An area had been baited with corn and other grain to attract a flock of some forty birds known to be wintering there. This group, like many others in the Catskills and Southern Tier, had developed from wild turkeys originally supplied by the Pennsylvania Game Commission and then reared on a New York game farm.

After an overnight stay at the Conservation Department's Game Farm in Delmar, the turkeys were transported by truck to the southwestern corner of Berkshire County, just a few miles from the point where the New York, Massachusetts and Connecticut borders join. They were then taken by motorized toboggan over snow-covered slopes to the release point at a 2,000-foot level in the Mount Everest Reservation.

If the birds are successful in rearing young, the resulting population can be expected to spill over and benefit all three states.

New York has been releasing wild gobblers in selected areas of the State since 1952, when birds that had presumably wandered north from Pennsylvania had begun to appear in parts of the Southern Tier. Some 4,000 turkeys reared on New York game farms from poults supplied by Pennsylvania have been stocked in a total of 22 New York counties.

Russian pollution

Russia has reportedly achieved many firsts, including orbiting a man, but she is having trouble, as we are, with such down-to-earth problems as water pollution, according to information in Russian publications. They point to the alarming increase of industrial pollution of the Soviet Union's 225,000 miles of stream with its accompanying loss of fishery resources and danger to public health. Sanitary inspectors have advised citizens not to drink water from streams without boiling it. Factories have been fined for excessive pollution of streams, but this has not been effective in solving the problem, according to their report.

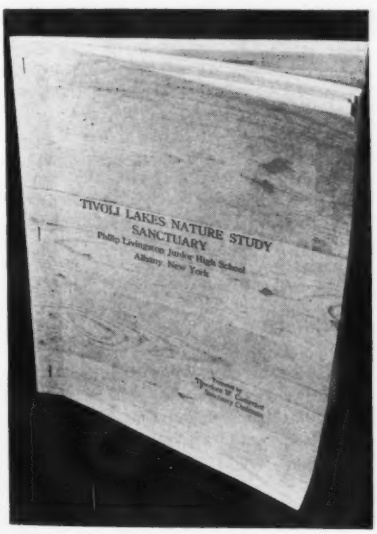
Wood collection

One of the more important wood collections in the world is located at State University College of Forestry at Syracuse University. The collection includes nearly 20,000 wood specimens from countries of all six continents. The United States, including its territories, is quite completely represented. Contained in the American part are samples of trees from all over the U.S., including native and naturalized woods. Every state tree of the U.S. is on file and specimens from North and South America are most completely represented.

Woods of almost every type and color as well as the softest and the hardest are included along with unusual samples like ivory wood, which is considered sacred by some African tribes; Indian woods shaped in the form of replicas of the Taj Mahal and virtually all the woods mentioned in the Holy Bible.

Each wood sample in the collection is classified according to such characteristics as flowers, fruits, leaves, etc. of the tree from which it was removed. Almost all the wood specimens have been verified through herbarium collections at the College and elsewhere.

A collection, such as this one, combined with another powerful research tool—the electron microscope—can reveal to the scientist many secrets of wood.



Outdoor laboratory

More and more schools are establishing outdoor laboratories to supplement class room instruction. Interestingly enough, as these laboratories are put to work, school administrators are finding that a majority of subjects taught in the regular school curriculum—from science to social—can benefit from the visual aids that Nature provides.

An outstanding example is the Tivoli Lake's Nature Study Sanctuary of the Philip Livingston Junior High School in Albany. Here, an enthusiastic group of educators, conservationists, city administrators and civic groups have joined forces to provide a big working outdoor laboratory. It services a large number of elementary schools in the Capital District, too.

A well prepared teaching guide—produced by the students at Philip Livingston—gives a colorful outline of the 101 ways the laboratory can be used, by 'most every class and 'most every teacher and student. The outline shows how the laboratory can be used as a valuable visual aids tool in teaching art, citizenship and social studies, biological sciences, mathematics, homemaking and others. It provides for a pupil's Fur, Fin and Feather Club complete with conservation pledges and unique identification cards. Members of the Club take on specialized assignments in development of the area and have some 22 operations to choose from. Here are just a few: Operation 5—Arbor and Wildlife Day Planting Program; 10—Herb Garden; 12—Christmas Trees for Birds; 17—Planting Maple Sugar Bush; 21—Construction of Relief Map.

Contests are an important part of the program and include photo, essay, engineering, poetry, foreign language, science, citizenship, homemaking, industrial arts—including painting, textile design and posters—to mention a few.

Each semester seems to add to the possibilities of the unique arrangement in bringing natural resource education to elementary and high school students where it will pay the greatest dividends in the future.

Salt water conversion

The Island of Guernsey, off the coast of England, has no rivers or lakes and its contours are such that rainfall tends to run off rather than soak in.

Domestic fresh-water requirements are met by a multiflash evaporating plant that can produce 500,000 gallons of pure water from sea water in 24 hours.

In many places the point of diminishing returns has been reached in drawing water from the upper reaches of rivers or from the springs which feed them. Adequate fresh-water supplies, year 'round, may well depend in some areas on salt water conversion units working at least part time. The development of nuclear power may bring the cost of production by evaporation in line with reservoir collecting of natural fresh waters.

English starlings

One G. D. Roger, writing in The Journal of Forestry, *has the following to say concerning the starling control problem in England:*

"For over five years, starlings have roosted in very large numbers in the reeds around our large pond. It is impossible to give an accurate count, but I would estimate that the number ranged from 500,000 to a million. Before going down into the reeds, they settle in black masses in the tree tops—and in this way have destroyed the tops of several large conifers.

"A few years ago, I decided to rid myself of them by using rockets. The ones I used were the small, children's type, costing about a shilling. They must have a good bang and not just a few colored stars trailing down. It is the bang that shatters the starlings' nerves.

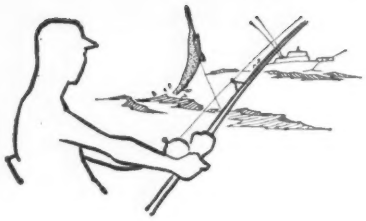
"Last November, however, starlings arrived from all corners of the globe to roost in our reeds and we must have had five times as many as we ever had previously. The sheer weight of numbers had flattened 1½ acres of reeds and made the roost uncomfortable. They left the reeds and made their roost in a plantation of 30-ft. Douglas with blocks of hazel. I was away on a holiday and it was a fortnight before I discovered, even in this short time, the plantation had become whitewashed and the smell was beyond description.

"I got in touch with the local Pest Officer and he managed to get a hundred good bangers that give two brilliant flashes 40 ft. up with loud bangs.

"The operation was a rather terrifying experience. We stood in this wood with black clouds of starlings descending into the trees—until you couldn't have squashed another in anywhere. On the first night we let off five of the bangers which shattered them enough to disperse the following night into four different plantations. We then increased our force of helpers, each armed with a gun and some bangers, to cover all the roosts. After three wild and wet evenings, I though our troubles were over, when I saw them flying over our estate. Unfortunately, my neighbor spotted them and shot them up on the first night and to my dismay they came straight back to us. It took us four more days before we finally dislodged the last of the flocks."

Venison identification

Conservation law enforcement technicians can now identify venison even when mixed in a meat loaf or sausage and thoroughly cooked.



Letters to the Editor

Wild rice

Dear Sirs: In Mr. C. Wagoner's article on Minnesota's wild rice crop, he states that no mechanical device has been invented for harvesting wild rice. There are devices that have been invented, but according to the laws in Minnesota, it is illegal to use any mechanical device.

The Conservation Department of Minnesota has rigid laws on harvesting wild rice. First you must have a license for your boat, which cannot exceed 16 ft. in length and 36 inches in top width. Nor can you use any motor; only a pole or a paddle. You, yourself, must also have a license for harvesting. Nor may you use any machine or mechanical device or implement except a flail (beater) not over 30 inches in length nor more than one pound in weight and operated only by hand.

You must not have any firearms, traps or nets in your boat.

You may harvest the rice only between the hours of 8 A.M. and 6 P.M. each day.

There is also a bulletin printed when the crop is ready to harvest setting forth the length of the season.

If the crops are not up to par, certain streams and lakes are closed against harvesting. No white person may harvest rice on waters on the Indian reservations.

The boats, or harvesters, are limited in the waters. Some of the larger lakes, such as Rice Lake, may have up to 16 boats; smaller lakes, as few as 5 boats; some only one boat.

After harvesting, the rice must be parched over a low fire. This, too, is a slow process and is done mostly by the Indian women.

Mrs. B. A. Penner,
Two Harbors,
Minnesota

Bouquet

Gentlemen: I should like to toss a couple of well-deserved bouquets, if I may, for I don't think that enough compliments are paid to the observers who man our fire stations.

I doubt that many people, who walk the well-maintained and litter-free trails to the towers, realize how many hours of hard labor go into their care and maintenance.

We climbed several mountains last summer and found the trails in excellent condition. But we would like particularly to commend Charlie Kays, who mans the Vanderwhacker Mountain tower, for his beautifully kept trail. This trail is one of the prettiest we've seen and Mr. Kays' obvious pride in it is reflected at every turn.

Sturdy new hand-hewn bridges span the little streams and every spot even remotely damp is thoughtfully provided with its own corduroy walk. The trail is well brushed and tidy as a housewife's kitchen. I certainly hope that Mr. Kays wreaks swift and fearful vengeance on any who dares to leave orange peel or beer can in his wake.

The rangers and observers who keep the Adirondack trails so well maintained for our pleasure should certainly be commended.

(Mrs.) Orville Slade, Gloversville

• *It is a pleasure to acknowledge your letter in which you have taken pains to commend our Observer on Vanderwhacker Mountain, Charlie Kays, for his efforts in keeping the trail in such good condition. Please accept the appreciation of all concerned for your nice letter.—E. W. Littlefield, Assistant Commissioner for Lands and Forests*

Washington bear

Dear Editor: I was interested in your answer to "Can't Bear Bear" in the April-May, 1961 issue of THE CONSERVATIONIST.

Here on the west end of Washington State's Olympic Peninsula, local land managers have found it desirable to reduce the high bear population to alleviate the damage to the second growth trees.

We are presently co-operating on a bear snaring program. One of the men working on the project has found that if a bear is captured, killed and left in place it is effective as bait to attract other bears.

Contrary to your findings in the Adirondacks, bears around here apparently find bear meat palatable.

Willard G. Ulmer,
Forks, Wash.

• *The letter which you have noted had reference to bear entrails only, whereas on the Olympic Peninsula whole carcasses were left. We think that may be the difference. —Editor*

Report from Bavâria

Dear Sir: As a fellow New York Stater now on extended active duty with the United States Army in Germany, I read with great interest your synopsis of Bruce Kilgore's account of hunting in Bavaria. Although Mr. Kilgore's description of Bavarian hunting customs and regulations is quite accurate, the picture is far from bleak. Although the same regulations governing German nationals are applicable to U.S. Forces stationed in Germany, i.e., the successful completion of a six months' course of hunting laws, customs, study and identification of game, etc., followed by a stiff final examination, we nevertheless enjoy all the privileges available to German citizens. And these privileges are, in my opinion, unequaled anywhere in the world.

Through the practice of rigid hunting laws, customs and advanced conservation practices, hunting is a sport enjoyed 365 days of the year. Regardless of the month, there is always some game in season. And the specific seasons are for the most part much longer than those found in the States. For instance, the season for roe deer is from 15 May to 30 January; hirsch or red deer (European stag) is from 1 August to 30 January, as is also the same season for fallow deer. Chamois is from 16 September to 30 January: mouflon from 1 August to 30 January; pheasants from 16 October to 15 January; wild doves from 1 July to 15 April; woodcock from 1 September to 5 April, and wild boar may be hunted all year with no closed season.

In addition, there is no actual limit to the amount of game any one hunter may kill, regardless of species. The game limit, rather than being imposed on the individual, is imposed on the area hunted. From accurate studies and census, a revier (hunting area) will receive an annual allocation called the "abschuss plan." Once the assessed amount of game has been killed, there can be no further hunting of that species in that revier until the following year when a new abschuss plan will be published. This of course, guarantees sufficient stock to produce game for the coming years without running the risk of either "over-shooting" or "under-shooting" a given area; the former leading possibly to the extinction of the game, the latter to danger of possible severe crop damage. A hunter's yearly success therefore, depends largely upon the

number of invitations he receives from revier owners, or, if he is financially independent, the size of the hunting revier he may own. In addition, hunters may enjoy the use of federal-owned lands for a small charge (usually $1.50 per day), but must pay a trophy fee in the event they shoot game classified in the trophy bearing category. For American Service personnel, trophy fees are paid for by Special Services through an agreement made by U.S. Forces and the West German government in 1951. An American hunter, upon successfully passing the required hunter's examination and obtaining a license, is automatically awarded a bag limit card for hunts on federal-owned land. There is no fee for this card, which gives the American hunter the opportunity to take annually as many as six roe deer, two red deer (hirsch), one chamois, one fallow deer or mouflon, and one auerhahn (the most prized trophy in Germany), in addition to one extra selection of his choice—and all this for the price of his license; roughly twelve dollars plus four dollars for insurance.

Americans serving in Germany are always welcomed guests at the hunting lodges of our German hosts. I know of no American soldier that has ever been denied an invitation to enjoy a hunt on either private or federal hunting areas. Perhaps my personal success serves to emphasize this point: In three and a half years of hunting the Rhineland, I have shot over ten good bucks, three wild boar, and innumerable small game—perhaps more game than most hunters shoot in a lifetime in the States: and yet, by German standards, I am still a novice jaeger! To the German people who have been hunting their reviers before the discovery of America, hunting is almost a religious practice, guided by sound principles of conservation coupled with good sportsmanship. And to every other hunter they wish a hearty "Waidsmann-Heil."

Conrad H. Munster,
1st Lt., Artillery,
stationed in Germany

P.S. For your interest I have enclosed a Game Bag Limit Card as issued by U.S. Forces for use of service personnel.

More from Bavaria

Dear Sir: In reading the December-January, 1960-61 issue of THE CONSERVATIONIST, I became at once interested in your article, "In Bavaria," page 38.

Having resided in northern Bavaria now for more than six months, I have searchingly looked into many of the local and state hunting laws of Germany, Bavaria in particular, in hopes that I might find an answer or two to some of America's congested hunting problems. To me it appears that our own state and federal government authorities could profit highly by doing the same.

For some time now I have procured my hunting licenses here by giving the prescribed fee to whomever is authorized to handle their sale. Easy? Yes, definitely! Just a few facts, sign your name and the license is yours. I have seriously pondered the question of why doesn't the various state authorities adopt such a course on hunting laws and study and identification of game and non-game species (or of fowl as the case may be) including some of the principles of game management. This could be easily established and hunters tested on such material as they might have the need of knowing in the same manner as automobile operators are.

I can definitely see an advantage for each and every hunter being required to purchase hunting insurance. Why? All at once there comes into my mind's eye the number of articles appearing in our newspapers about a cow being mistaken for a deer or accidental property damages that occur every year during the various hunting seasons.

Don Sloan, Hof/Salle,
Bavaria, Germany

• *We doubt that the Bavarian system, in toto, would be very popular here, but their licensee training course has much to recommend it. In fact, several features have been incorporated in New York's Hunter Safety Training course. As for insurance, a comprehensive liability plan merits consideration. —Editor*

Black 'chuck

Dear Sir: I enclose a photo of a black woodchuck which was shot along Cole Road, off Route 21 in Wayne County. The 'chuck was shot by Charles Breed of Palmyra and weighed just under 5 lbs. I have asked several woodchuck hunters about this and no one has ever seen a solid black woodchuck before. Are these rare around New York State?

Robert Gilmire, Red Creek

• *The black or melanistic woodchuck is rare in New York State. The last record that I have was of one taken May 23, 1957 on the Delmar Game Farm in Albany County.*

Practically every year we receive reports of melanistic animals seen or taken in the State. Probably only one black individual occurs in several thousand births.—Don Schierbaum, Senior Wildlife Biologist

The trouble with starlings

Dear Sir: What can be done to control starlings? Many home owners have been so bothered by these birds that they are on a verge of selling their homes and moving to other areas.

Walter Yaciuk, Bronx

• *Actually there doesn't seem to be any practical answer to the starling problem. In the* Saturday Evening Post *issue of April 26, 1952 starting on page 30, J. C. Furnas wrote an article entitled, "The Starling Nuisance—It's Driving Everybody Crazy." His title is essentially correct. Since Mr. Furnas wrote his article there have been a few more experiments with regard to eliminating starlings and the only one which shows promise doesn't show too much. This method is to capture one live starling and, with a tape recorder handy, hold the captive bird upside down until it screams for help. Periodically, play this recording over a loud speaker system in areas where the starlings are making a special nuisance of themselves. The hope here is that the brethren, hearing these cries of fright, will flee the area.*

It seems to me that it shouldn't take the starling long to find out he has been had, and if you do succeed in chasing him from one place he'll make himself a nuisance some place else.

Over in England, until the last few decades, the starling was considered a mighty fine fellow. He had very clean habits and didn't travel around in tremendous flocks. In America, however, they have learned bad habits. They now will eat any sort of garbage, just love all the rococo ornamentation of our buildings and have learned that, especially in winter, cities furnish more and warmer roosting places and more food than the countryside.

There are very few people who intentionally feed starlings. Most of the food they obtain in cities is that left over from feeding pigeons, from garbage left exposed and from other careless disposal of waste foods. The pigeon problem is simpler since each city supports just as many pigeons as pigeon lovers are willing to feed. However, if ordinances forbade the feeding of pigeons, not only would the pigeon population go down but probably that of the starlings, too. However, some people seem to love pigeons so much and to be so numerous, that any attempt to make effective city ordinances has generally failed. If normal regulations concerning the city sanitation were enforced (for instance, the law against leaving garbage uncovered) it would help considerably. People, who feed our native song birds, could help by spacing wires against the entrance of their feeding trays so that the small birds could get in, but not the starlings.

Poisoning is out because of the great danger, not only to other birds and animals but to children. Shooting is certainly out especially in cities, and trapping is expensive since one must hire the people to empty the traps and either kill the birds or distribute them in other areas some distance away.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Credit due

Dear Editor: The letter to the Governor in the Feb.-Mar. issue, "Well Done," gave most all the credit for the search work done on the downed fliers to the State Troopers and the Department men. It seems to me from what I saw at the time that the men who really went into the woods on foot, were civilians and old-time trappers and hunters. The Sunday they found the last flier, I was on the trail into Rodger and North Pond looking for my beagle hound lost the day before and met four men at different points starting through that section to the Ridge Road, a distance of about 10 miles. One by the name of Joe and the other Birmann; I didn't get the names of the other two. Joe went through the east side of Hoffman Ridge. Birmann went over the top, which I understand is about or near 4,000 feet. It was below zero at the ponds and snow, I wonder what it was on top? The other two men took the west side of the mountain. In the 45 years I've hunted and fished the North Woods, I've found that these old-time guides, hunters and trappers sure know their woods in any kind of weather and are always willing to help in any search, but never did get too much credit for their efforts. (I, myself, after 45 years in the woods can't get lost if I stick to the trails).

Please don't misunderstand, the State Police and the Department men did do a very good job. That's their job and they get paid for it. These other men I wrote about also did a good job without pay and very little mention. How about giving them a little plug in your next issue? Believe me, there were many of them in all parts of the section who helped in the search—I saw them start and finish day after day.

Carl Jonsan, Utica

• *Emergency searches, such as was this, are arduous, sometimes hazardous and not infrequently without the recognition and credit deserved. We were glad of the opportunity to pass the word along and we're particularly grateful for your letter commenting upon the expert assistance of the "old-timers." Always needed; always appreciated.—Editor*

Spots on the liver

Gentlemen: I have recently been told that, when cleaning rabbits which I shot, I should look for white spots in the liver. If these white spots are present, the rabbit was diseased and the meat is inedible.

Kindly advise whether or not this is true.

M. Mathes, Catskill

• *Your question about white spots on rabbit livers bears upon one of the most misunderstood subjects connected with wildlife. And it is an important one because the confusion undoubtedly results in the wastage of more good meat than in all other species put together (that is, in relationship to diseases and parasites).*

The fears connected with white-spotted rabbit livers relate to the bacterial disease tularemia, which is transmitted to man either in dressing infected animals or from the bite of infected ticks or deer flies. While rabbits are the principal source of transmission to man, the disease is relatively uncommon in New York State as compared with the more westerly states. Rabbits sick from tularemia do not behave normally and should be shot and buried without handling. This disease is fatal to rabbits and normally disappears from a rabbit population after freezing weather causes ticks to leave their rabbit hosts.

However, there is another, much more common cause of white liver spots. The dog tapeworm is found in larval form (an immobile, intermediate stage) in the rabbit body cavity. To get there it migrates through the liver (or remains imbedded therein) making white trails or spots. Since nearly 80 per cent of the wild rabbit population carries one or more of these larvae (a white organism enclosed in a small, glistening bladder) the chances of seeing at least one white spot on the liver are very good. However, in dressing the rabbit all such larvae are removed. The rabbit is perfectly safe for eating.—Joseph Dell, Conservation Biologist

Porkie protection

Dear Editor: An area which I visit in the Adirondack Park, not far from Old Forge, has a considerable number of porcupines, which have recently been making themselves a nuisance through their fondness for rubber and plastic used in motor vehicles. A road grader left out over the week end had the radiator hoses chewed off when the crew returned on Monday morning; this required a half day lay-off before the repairs were made. Automobiles parked while the owners have been away for two or three days of fishing have had radiator hoses and ignition wires chewed up.

The owner of the auto in the enclosed photograph, after one such experience, now makes a roll of chicken wire standard equipment to protect the car while he is away camping. He says it's cheaper than garage repair bills.

Gustav A. Swanson,
Head of Department,
Dept. of Conservation,
Cornell University

• *A good idea.—Editor*

Sumac Control

Dear Sirs: Near the Town of Marlboro, we have fourteen acres of which approximately one-half is cleared. Well, this half was entirely cleared at one time. Now the sumac, silver leaf maple, sassafras and other miscellaneous trees are taking over. The main problem in trying to keep this land cleared concerns the sumac, they seem to grow like "a weed" with many shoots coming up along a twenty-foot length of root. In the past I have been pulling these trees out in the spring when the ground is soft. However, it is not always possible to spend a week end up there at this time of the year. Also, it seems if a small piece of root remains in the ground, another tree quickly starts to grow.

Therefore, I would like to know if there is some way I can kill the entire root system of this tree with some inexpensive chemical that would not harm the soil. I stress an inexpensive agent because there are so many commercial items of this nature on the market and in a price range that can put the cost of such a project out of the picture. I do not wish to use any salt for I am sure this would ruin the soil. I have also heard about a mixture of kerosene and saltpeter but I do not know how this will effect the soil.

I would appreciate it if you could possibly furnish a solution to the above problem for which I would be most grateful.

Robert P. Bodendorf, Richmond Hill

• *Much has been written on the use of various materials for killing brush and other undesirable growth. Perhaps one of the more complete sources of information is a recent bulletin (January, 1961) issued by the U. S. Department of Agriculture, known as Agriculture Handbook No. 185, "Releasing Conifers in the Lake States with Chemicals." Copies may be obtained from the U. S. Forest Service, U. S. Department of Agriculture, Washington 25, D. C. Another source is Cornell Extension Bulletin No. 1001, "Killing Undesirable Woody Plants with Chemicals," by L. S. Hamilton and R. R. Morrow. This bulletin may be procured from the New York State College of Agriculture, Cornell University, Ithaca.*

Chemical herbicides fall into two general types—hormones and tree poisons. They also may be spoken of as being selective or non-selective. The selective herbicides are normally recommended for controlling undesirable hardwoods and brush in coniferous stands. Those in the non-selective group are toxic to both conifers and broad-leaved vegetation. The selective properties of these chemicals are relative. Extremely heavy dosages will kill all vegetation. When properly diluted they will kill some species and not others.

The most popular of the selective herbicides are 2,4,5-T and 2,4-D. These are sold separately or may be combined in a mixture. The 2,4-D chemical can be used to kill shrubs and hardwood trees such as hazel, alder, sumac, willow and aspen. For over-all control of the broad-leaved species, however, 2,4,5-T may be somewhat more effective and thus will better solve your problem because of the varieties represented on your land.

Examples of non-selective herbicides in-

clude Ammate (ammonium sulfamate). Monuron and other urea derivatives. It should be remembered that these will kill conifers as well as broad-leaved species. Ammate will also kill grasses.

A commonly used tree poison is sodium arsenite. This chemical is poisonous to humans as well as animals and thus must be used with care. I would not recommend it for your particular problem.

The hormones have been proven effective when applied in frills as foliage sprays and as a basal spray. Tree poisons are usually applied in frills or injected into the tree with a tree injector tool.—C. F. Baar, Superintendent, Forest Investigations

Thought for the day

Dear Sir: I would like to know: (1) Can all birds talk? (2) If so, which ones can talk best?

Do you have any proof that animals can think?

Wm. J. Spoon, Rome

• *By "talk" I assume you mean imitate human speech. In this category there are relatively few birds which can talk. Many birds like the mockingbird are adept at imitation, but do not have the voice range to properly imitate human speech. Crows can be taught to speak, and I might point out that it is not necessary to split their tongues. Most species of parrots can imitate the human speech and many of the starling family can do so. I do not know of anyone who has taught the European starling to speak but his cousins the mynah birds of India make excellent speakers. None of these birds, of course, have the slightest idea of the meaning of the words they imitate. They only know they are generally rewarded for their imitation.*

The subject of animals "thinking" is a very complex one. The word must first be defined so we understand each other clearly. "Thinking" or "reasoning," in the human sense, refers to the ability to use one's past experiences to solve a new problem. If the problem is one which has been solved before, such as finding food in a maze, this is not reasoning but memory work. If the problem is one of obtaining food, for instance by a monkey which has been taught to use a stick for things not related to food and the monkey is able to pick up the stick and poke down food from some high place, you might consider this reasoning. Thus you might say the monkey thinks.

We tend to say that animals think merely because some action of theirs has resulted in the solution of a problem facing them, when their actions were the result of habitual activities and not the result of examining the problem mentally and coming up with a new solution from the facts at hand.

Despite evidence we might have to the contrary man is certainly the most "thinking" animal. Evidence further shows that the great apes probably come in second, although far behind, and recent evidence shows that the dolphins and porpoises (mammals) are very close to the apes. Evidence shows that even amoeba can learn and the same goes for earthworms, but this is just in the order of learning that something burns them and they should avoid it the second or third time and is definitely not reasoning. We hope this answers your question and gives you food for thought.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

"White" deer

Dear Sirs: Today, as my family and I were checking on the deer around our favorite hunting area, we saw a very unusual sight and thought you might be interested to hear about it.

On this side hill was standing a doe, very dark red, or perhaps a burnt orange color. As if this wasn't good enough, upon looking through the binoculars I saw three more lying down. While we watched, the three grew restless and got up. One of these was more than half white.

Several years ago I shot one that was almost all white. On one rib cage was an egg shaped spot covering maybe two feet in area that was a normal color. The eyes and nose, etc. were natural. The white area on this was a dirty yellowish white, whereas the one I saw today was pure white. It was indeed beautiful. I might add that I've seen as many as a hundred and more deer on a single evening in this area, so I guess they aren't all gone as some hunters have reported.

Gerald Abbey, Geneseo

• *It is quite unusual to see a deer with more white than the usual red in its coat color. In the field, I have never seen such a deer. However, hunters have brought such animals to the deer checking stations where I have worked and each year we receive letters somewhat like yours from 10 to 20 individuals.*

The lack of normal color in the hide is a generic condition probably resulting from inhibitor genes which prevent the development of normal color. Under field conditions, an occasional deer with more white than normal are seen in specific localities. These deer will be observed for a period of two or three to as much as eight to ten years, then the observations in that specific locality frequently discontinue. This sort of happenstance pattern has caused me to think that the development of these more white than usual deer originate from a single pair of deer that mate each year and continue to throw these off-color individuals.

It would seem that this off-color condition is a recessive characteristic, otherwise it would be perpetuated in an area and would develop among a larger proportion of the animals.—C. W. Severinghaus, Supervising Wildlife Biologist

Good company

Dear Sir: Please send me a copy on each of the following: The Constitution of the United States, the Story of the Pilgrims, Robert E. Lee, John Hancock, Abraham Lincoln, and the fish and game laws.

Vivian Fede, Elmont

• *We are surprised to find the Fish and Game Law in such historically illustrious company—but pleased.—Editor*

Clarence A. German

Dear Sir: The Columbia Banking Savings and Loan Association of Rochester presented its First Annual Sportsman of the Year Award, April 26th to Clarence A. German, at a testimonial dinner in the Rochester Yacht Club honoring German's 25 years as a conservationist.

The citation read: "In recognition of his devotion evidenced during twenty-five years in the cause of conservation and in recognition of his loyal service as president of the Genesee Conservation League, as a member and officer of the New York State Conservation Council and as a true sportsman, Columbia Banking Savings and Loan Association extends to Clarence A. German heartiest best wishes as the first recipient of its Sportsman of the Year Award. His example of outstanding leadership in the interest of good sportsmanship is hereby acknowledged."

Peter B. Whitcombe, Rochester

• *We can't think of anyone more deserving. An excellent choice; an outstanding conservationist.—Editor*

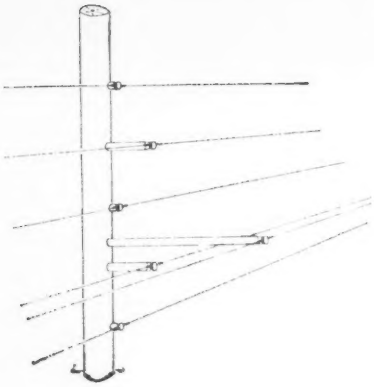
Famous fish and fisherman

Dear Sir: I am a subscriber to THE CONSERVATIONIST and in reading the April-May magazine, page 47, I noticed my great uncle's name, Clinton Miller, of Brookhaven, in reference to having a carved wooden effigy of the famous trought caught in Carmen's River, South Haven, L. I. This was caught by Daniel Webster who was a frequent visitor at the old Carmen Stage Coach Inn in South Haven, owned by Clinton Miller's grandfather, Carmen.

The carved wooden fish has since been given to the Presbyterian Church of South Haven as a weather vane and we have the lovely old painting of the same trout. The place is now Brookhaven, L. I.

Frederick W. Miller, III, Brookhaven

• *This huge trout, referred to in Austin S. Hogan's article, "Fly Fishermen's Bicentennial," weighed in at 14½ pounds.—Editor*



Deer fence

Dear Sir: For the past several years my garden in Westchester County has been almost literally a picnic ground for the deer. Although the population of those animals has presumably been reduced by the open seasons with shotguns, there still seems to be a fair number of them around.

Two of the crops which have been almost completely unsuccessful on account of deer in the past have been strawberries and tulips. These two, which we had given up for some time, my wife has decided to plant again.

Obviously, spraying with deer repellent is impractical in those cases and I am, accordingly, writing to inquire whether a two or more strand electrified fence has proven to be reasonably effective protection. Such being the case, I would also ask you what height fence you would recommend.

William S. Glazier, Chappaqua

• *The Conservation Department has experimented for several years to develop means to keep deer out of orchards, nurseries and cultivated fields. Automatic noise makers, repellent sprays and other materials based on objectionable odor or taste gave only temporary protection. Moreover, these measures are often not practical for large areas and would not be desirable for use on your particular plantings.*

Deer-proof fences appear to offer the only dependable means of protection. Admittedly, such fences are expensive. The cost, however, can be held to a surprisingly low figure, particularly if you have a supply of posts and are not obliged to hire additional labor in order to erect the fence. There are two types of deer-proof fence.

The outrigged style electric fence is patterned closely after the model developed by the Vermont Fish and Game Service. It is particularly suited for use around home gardens and small orchards, but has been used successfully to protect areas of several acres in extent. More than 150 such fences built in Vermont have given excellent protection, and experimental units tested in New York have proven effective except under deep snow conditions. In spite of the comparatively low height of this fence, deer rarely jump over it unless pursued by dogs. Instead they apparently tend to investigate the electrified wire on the long outrigger stick, thus receiving a shock before reaching the main part of the fence.

The cost of construction runs about 75¢ per rod, exclusive of posts and labor. This figure is based on a two-acre field and includes controller and other materials. In larger fields the cost per rod should be lower.

Fourteen gauge, soft iron galvanized wire is desirable. Barbed wire can be used but is much more difficult to handle and is no more effective than smooth wire. Aluminum wire is light, conducts electricity better than iron wire, but breaks rather easily. The wire should not be stretched too tightly and should be fastened to the insulators by tying with wire rather than with clips.

Posts can be set up to 30 feet apart, but closer spacing is necessary where the ground is uneven. Corner posts should be well braced. Wooden dowels one inch in diameter are commonly used for short outrigger sticks. Reject chair turnings, when available, are ideal for use as long outriggers. Insulators can be nailed to the ends of the sticks, but the use of wood screws (#10, 2½ inches long) permits the removal of insulators with a minimum of breakage. By drilling a ⅛-inch diameter hole in the end of each stick, splitting can be practically eliminated.

Battery-operated controllers serve well, but require more attention than the "high-line" type. The wires on the outrigger sticks are electrified by connecting the "fence" terminal on the controller, while the other three wires are connected to the "ground" terminal, and thence to the earth. Splices and connections should be soldered and decrease in shock on wet days can be largely avoided by varnishing the outrigger sticks.

A weed control model "high-line" type controller will give best results, since this type will keep the fence line relatively clear of tall weeds by singeing them as they grow and touch the charged wires.

A second type of deer-proof fencing is the woven-wire fence. A fence of this type 7½ or 8 feet high is virtually deer-proof under most conditions. Although somewhat more expensive than the electric fence in terms of construction cost, it requires less attention and is cheaper to maintain.

Corner posts should be braced, and care should be taken to keep the bottom of the fence not over two or three inches from the ground.—Game Research Staff

Winter visitors

Sirs: One morning I saw a strange, interesting looking pair of birds at one of our feeding stations. The brighter of the two had a dark lemon color on back and breast, white markings on wings and a white cap-like ring on top of its head. It was about the size of a robin—the bill appeared rather full, and hooked-like: light in color. Referring to Arthur Allen's "Stalking Birds with Color Camera," the Alaska yellow wagtail answers the above description. The notes say, however, that this bird winters in China. Would it be possible that some spend the winters here or would there be another bird of this coloring?

Irvine Goodwin, Saranac

• *It is very difficult to be certain of identifying such birds as you describe from a distance. There are too many variations in the bird world to be sure of anything. There is one bird, however, of which a variation might fit your description. This is the evening grosbeak. The grosbeaks are quite large sparrows and approach the robin in size as much as the wagtail you referred to. Occasionally, the yellow forehead and eye strip is much paler and even appears white.*

The wagtails have rather slender bills which do not appear as hooked as the grosbeaks'. They have a habit, from which their popular name is derived, of wagging their tails up and down rather continuously. You would almost certainly have noticed this. Also, the wagtail has more of a grayish brown back; definitely not a dark lemon color. Our best guess, from the description given, is that your visitors were evening grosbecks.—E. M. Rielly, Jr., Curator, Zoology, N.Y.S. Museum and Science Service

Jimmy's trout

Dear Sirs: My name is Jimmy Wilkinson, I live in Auburn, which is near Owasco and Cayuga lakes, and living near these lakes, I love fishing. I get up every morning at 4:30 o'clock to go fishing when I am not in school and after school I go too. I go to Cayuga 50 per cent of the time and Owasco 40 per cent of the time. While I was fishing in the inlet of Owasco Lake the 5th of April, I caught an 8-inch brown trout and it was tagged, that is why I wrote this letter. The tag is enclosed. The fish's measurements are: Length, 8 inches; where caught, Owasco Inlet; date, 5/4/61; weight, 1 pound.

If possible, could I please have the tag back for a souvenir. I am 14 years old.

James Wilkinson, Auburn

• *The tagged brown trout that you caught on April 5 was one of 4,000 brown trout stocked in Owasco Inlet on March 28, 1961. The main reason for tagging these trout is to determine how many the fishermen catch as well as to find out if they migrate to other waters—how long they will survive in the stream and other information. In order to follow up on an experiment of this kind, we make population studies with an electric shocker but we also depend to a large extent on fishermen, such as yourself, returning the tags. Experiments such as this one help us to insure that trout are stocked in suitable waters where they will grow and survive and where returns to fishermen will be good.*

Thanks a lot for your interest in sending in the tag and we would certainly appreciate your returning any tags from fish that you may catch in the future. I hope that you will find some time to study in between your fishing expeditions since that will come in handy some day.—A. C. Petty, District Fisheries Manager

Ed. note: — Unexplained are what Jimmy does during the remaining 10 per cent of his time and what Owasco Inlet trout eat to weigh one pound at 8 inches of length.

Co-operation

Dear Sir: Herewith is a report of activities last winter—duck banding by the Seneca Lake Hunters' Association, Inc. This is a co-operative program with the waterfowl biologist of the Conservation Department.

Our latest figure, (early February) is 1,336 ducks banded; our goal, 2,000 birds.

Ted Cornish, President,

Seneca Lake Duck Hunters' Asso., Inc.

• *As you know we have several winter banding stations in the Ontario-Erie-Central Lakes region, most of which are operated by volunteer groups such as yours. Over the past years, they have done an excellent job, but we have been unable to trap and band large numbers of scaup with any consistency. When your group indicated a desire to band, we had hopes that this site would fill a gap in the much needed banding data on this species. Our hopes were realized this winter with your banding of 1,107 waterfowl of which 736 or 66 per cent were greater scaup. To date, five stations have banded slightly over 2,000 greater scaup. Other co-operating groups and their records are: Canandaigua Duck Hunters, 619; Oswego Waterfowlers' Association, 465; Fur, Fin & Feather Club of Niagara Falls, 185; and Richard Ryan, Geneva, 40.*

The worth of your club's contribution and that of the others is great and you are to be complimented for a fine job. We are looking forward to working with you in the future.—Albert G. Hall, Chief, Bureau of Game

Paper making

Gentlemen: I would like you to send me all the information on paper making from trees.

Thank you very much.

Isabel Berckley, Harrisville

• *Your letter brings to light the embarrassing fact that we just do not have literature of a non-technical nature on the subject of paper making. However, I am enclosing what material we have which is mainly about pulpwood, in the hope that it may be of some interest and use to you.*

Should you wish to pursue this matter further, I suggest you write to the College of Forestry at Syracuse. They teach paper making there and even have a small paper machine on which they make paper for the college newspaper. Should you get to Syracuse sometime, I am sure they would be glad to show you through their plant and laboratories. You may also wish to write to the American Pulpwood Association at 220 East 42nd Street, New York City 17, New York, and ask them for literature on paper making. As a last source of information you might contact on[redacted]er mills in your area—the St. [redacted]mpany at Deferiet or the Go[redacted]ny at Lyons Falls.—E. H. [redacted] Forester

Ed. note—A good point here. We will see what can be done to secure an article on paper making for a future issue of THE CONSERVATIONIST.

Beaver brief

Dear Sir: Enclosed will find photos I took on my place April 29, 1961. First I will explain. I bought this 130-acre farm on county route 17, 12 miles north of Redfield, on the edge of the western line of the Adirondacks. The farm is across the highway from the State's Little John Game Management Tract. We lived here two years and then moved and rented in Syracuse for three years, now we are going back in June to stay again. We have been up every week end and holiday times since living in Syracuse.

Our whole family is interested in hunting, fishing and all outdoor sports, which leads up to my writing you.

The beaver on the Little John Tract, across from us, settled in about three years ago and we have watched them build their dam and house with great interest. Last summer, a pair or more came down the brook, crossed the road and built a small dam and house on our property.

We watched their work and progress and very few outside our family knew about the dam.

This past winter, the year around residents have never seen so many trappers, probably due to unemployment. A great sport, if handled right.

My land is posted this year because of the beaver and reforesting we have done in the last three years. In spite of private land and posted property, the photos show what some so-called sportsman did to our colony of beavers, between the dates of April 16 and 29.

As photos show he broke open the dam, let out the water, then sliced a third of the house off, also broke a hole in the opposite side so as to reach in or let light in to the center of the house. Well, that is the last of the beaver unless more come down from the big colony on Little John.

To sum up the story, it sure was a dirty trick by some one with no conscience. At least, if he has one, I hope it bothers him.

Kenneth H. Burd, Lacona

• *If food remains, particularly popple, beaver will move in again and repair the damage. But we doubt very much that the trapper who destroyed the dam and beaver house is losing any sleep because of a bothersome conscience. Should* he *return for a repeat performance, your local Game Protector would be much interested.—Editor*

Painless porcupines

Dear Sirs: I have read information about an animal that I got from you. I would like to talk about the porcupine and his quills. In the information you sent me it says that the only way to take out the quills from a dog is to pull them straight out with a pair of pliers, but that is painful. There is a better way. Proceed as follows: Take a cupful of ordinary vinegar and add one tablespoon of baking soda to it. Stir well. Now sop this solution carefully on all protruding parts of the quills. Wait ten minutes. Then again sop with the solution. Again wait ten minutes. You then can pull out the quills from the dog with ease and without hurting the dog at all.

The reason this method works is because vinegar is a mild solution of acetic acid. Porcupines quills are made up of lime and calcium. The acetic acid softens up the lime in the quills causing them to soften, wilt and become smaller.

I am only 14 years old and am interested in animals very much, and would like to be a forest ranger. The information I just gave you I got it from a book that my dad got from a woman where he works. The woman's husband does a lot of hunting in Canada. The name of the book is "Professional Guide Condensed Information Booklet." The book tells many different things you can do when you are lost such as, the danger of walking in a circle or spiral in the woods, how to cook food without utensils, how to make pond scum soup, how to make Indian lemonade. The book is written by George Leonard Herter. I hope you like the information I just gave you about porcupines.

Donald Dillon, Jr., Sanborn

• *We do, Don, and we wish you all success in your plan to be a forest ranger.—Editor*

Credits

First, second, third covers, pages 6, 24, 25, 28, 29, H. Wayne Trimm; 4, 5, 35, 36, 38, 41, Earl McGuirk; 7, American Museum of Natural History; 9, 10, 11, Fred Chambers; 12, National Wildlife Federation; 13, Doug Payne; 14, 15, Mount Wilson and Palomar Observatory; 16, 17, Abraham S. Straus; 18, New Jersey Division of Fish and Game; 20, Nick Drahos; 23, 26, 30, 31, 40, Roy Irving; 32, 33, G. B. Elliott; 37, Sport Fishing Institute; 39, Layden; fourth cover, N. Y. S. Museum.

How to do It Series:

Forest Landowner —A Case History

by Paul F. Higgins, Senior Forester

THIS story began about twenty-five years ago when Merle C. Hale of Detroit, Michigan, decided to buy a parcel of land in the Bristol Hills section of western New York's Ontario County. A place of eventual retirement, asthetic values and close access to Rochester were chief considerations in his choice of location. A part of the land was wooded, but other than the fact that this looked nice from the distance, the woodland was not an important factor in Hale's choice of the property.

The transaction completed, the new owner set about building a home and making other improvements. Ten years rolled by before he decided to do something about his woodlands. There was a considerable acreage of natural woodlands, about 25 acres of established plantations and numerous abandoned fields suitable for reforestation. The condition of the natural woodlands was not good. Like so much of our land in the State, a series of logging operations in past years had high-graded the timber stand—taking only the best—leaving the large, defective, poorly-formed trees. The plantations on Mr. Hale's property were in fairly good condition except for some insect damage in the white pine.

To find out what should be done with these woodlands, Mr. Hale contacted the Conservation Department's District Forester's office. He learned that through the passage of the Forest Practice Act of 1946 he could receive the services and advice of a technically trained Forester free of charge. As a consequence of this call a Forester called upon Hale and made an inspection of the property, followed by recommendations on what course of action should be taken. Recognizing Hale's real interest in doing something with his woodlands, the Forester urged him to sign up under New York's Forest Practice Act program.

The first step of placing his land under proper forest management had been taken. The Forester now prepared a management plan covering the woodlands, recommending actions that should be taken to place them in good growing condition. The original plan covered a period of ten years and has since been brought up to date.

Woodlands weren't Mr. Hale's only consideration; he also wanted to reforest his abandoned fields with both timber and Christmas tree species. We will not enlarge on this subject because both reforestation and Christmas tree culture have been well covered in preceding articles in THE CONSERVATIONIST. Suffice it to report that from 1951 to date, Mr. Hale has planted well over 200,000 trees covering an area of approximately 200 acres.

The first woodland improvement operation took place in the plantations that were already established. These stands had reached a size where there was serious over-crowding. Mr. Hale had three plantations which needed thinning, one of white pine, the other two of red pine. It was decided by the Forester that the white pine should be selectively thinned, because, as in the case of so many white pine stands, the area had been weeviled. Since this would be a non-commercial type of operation, it was decided it could be best accomplished by poisoning the poor trees rather than cutting them down. The Forester marked the stand for improvement so that the owner would know exactly which trees should be killed. This operation was completed five years ago and the stand has already shown excellent response. The increase in diameter growth is especially apparent.

There were two red pine plantations that needed thinning, one of about three acres and the other of approximately 12 acres. The smaller area was selectively thinned, using the cut material, treated with a preservative, to build a rustic fence around the house.

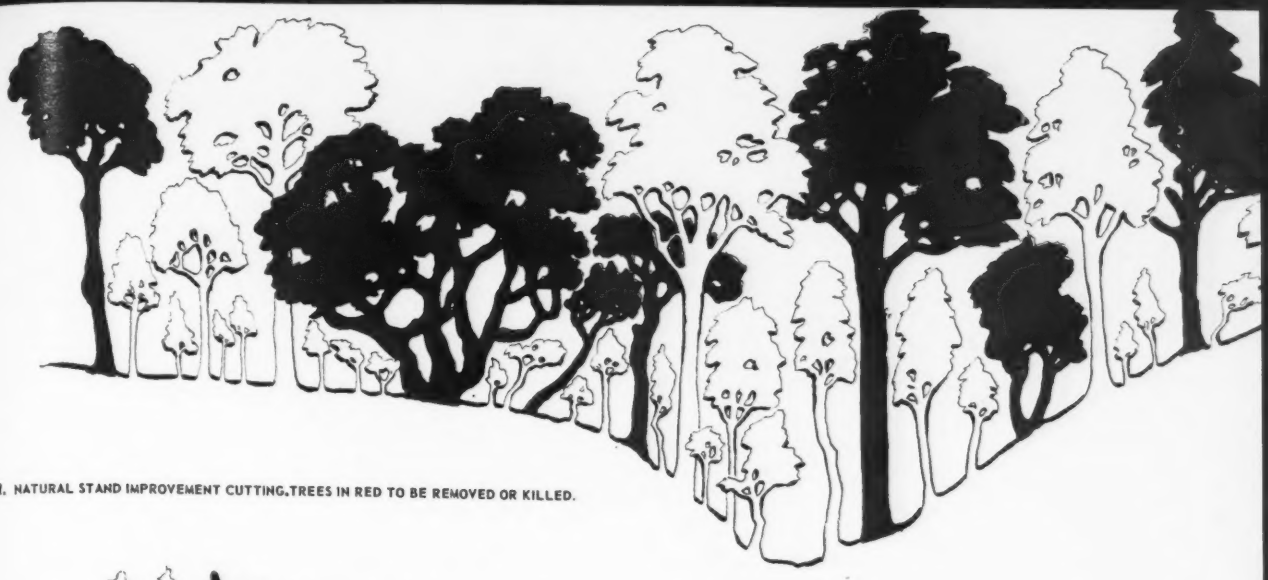
The other red pine plantation was thinned commercially. This plantation was as over-crowded as the white pine, the big difference being that practically all the trees were straight and of good form and of uniform size. It was decided in this particular thinning that every third row could be removed. This method opens up at least one side of the remaining trees, providing room to grow and adequate sunlight. The removal of these stems also cuts down on root competition which is important in the growth of trees. Trees, like any other crop, are subject to competition both above the ground and below where the roots are continuously competing for available nutrients and moisture. The cut material from this red pine plantation was sold, pressure treated with creosote and converted into barn poles and other products. It should be pointed out that scarcity of markets for this small material is one of our major problems in the State. This, however, should not deter the landowner from thinning his wood lot. Even when the trees are cut down or poisoned and left in the woods to die, the increase in volume and value of the remaining trees will more than make up for it in the long run.

The next step in Mr. Hale's plantation management program will be to prune a portion of his remaining trees. Usually the Forester will select about 100 trees to the acre, these to be pruned to a height of 16 feet if possible. All pruning is to be done with a saw as axe pruning is not recommended and may even be harmful to the tree. The idea behind pruning is the early removal of the lower branches so that at time of harvest the butt log will yield a high percentage of clear (knot-free) lumber. Trees 8 inches in diameter *or under* only should be considered for pruning. Above this size the value received would in most cases not pay for itself.

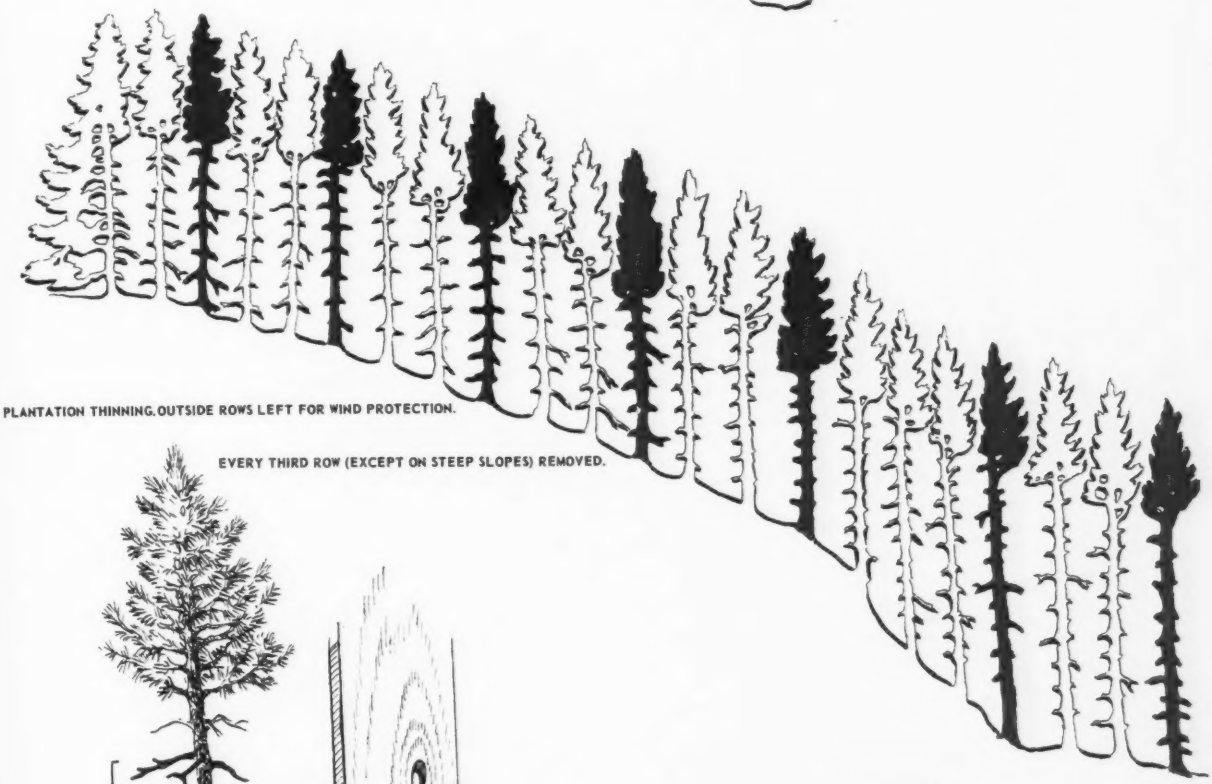
An additional thinning will be necessary in approximately twenty years, but at that time the plantation should yield small sawlogs, which in Mr. Hale's particular area, should have a ready market.

Now that the Hale's plantations are in order, it has been recommended by the Forester that he concentrate his time and effort on the natural woodlands. These, as mentioned at the beginning of the article, are in need of an improvement cut. The woods are full of large limbed, poorly-formed trees of little or no commercial value which rob the more desirable species of sunlight, growing space, moisture and nutrients. They should be killed either by poisoning or by cutting down. Where such trees to be killed are very large and are overtopping a large number of younger stems of good quality, poisoning would seem to be more advantageous. The felling of some of these very large trees can cause a great deal of damage, particularly if done by an inexperienced logger. The large-limbed, poorly-formed trees, commonly called "wolf trees," are basically the problem. Once steps have been taken to get rid of these and other weed trees, we will have gone a long way toward placing our natural woodlands in good condition.

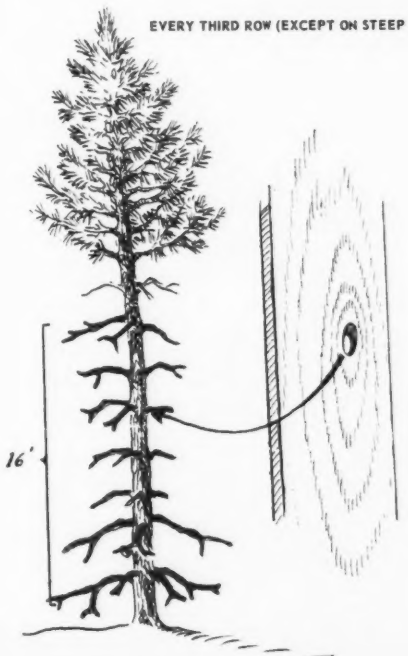
The future of the Hale woodlands seems assured because the land will be left to his grandson. This is good. The land should remain in the family, for, through Mr. Hale's foresight, the woodlands are increasing in value each year; becoming an ever greater asset. Moreover, the services of a technically trained Forester will continue to be available to the Hale family through cooperation under New York's Forest Practice Act.



1. NATURAL STAND IMPROVEMENT CUTTING. TREES IN RED TO BE REMOVED OR KILLED.



2. PLANTATION THINNING. OUTSIDE ROWS LEFT FOR WIND PROTECTION.
EVERY THIRD ROW (EXCEPT ON STEEP SLOPES) REMOVED.



3. BRANCHES IN RED PRUNED TO HEIGHT OF 12-16 FEET. UNPRUNED TREES PRODUCE KNOTTY LUMBER.

4. BRANCHES SAWED CLOSE TO TRUNK. AXE PRUNING USUALLY LEAVES UNEVEN STUBS.

(*Courtesy of N.Y.S. Museum*)

JOE-PYE WEED; PURPLE BONESET
Eupatorium purpureum